C21.5: 949/2

Vol. 949 Number 2

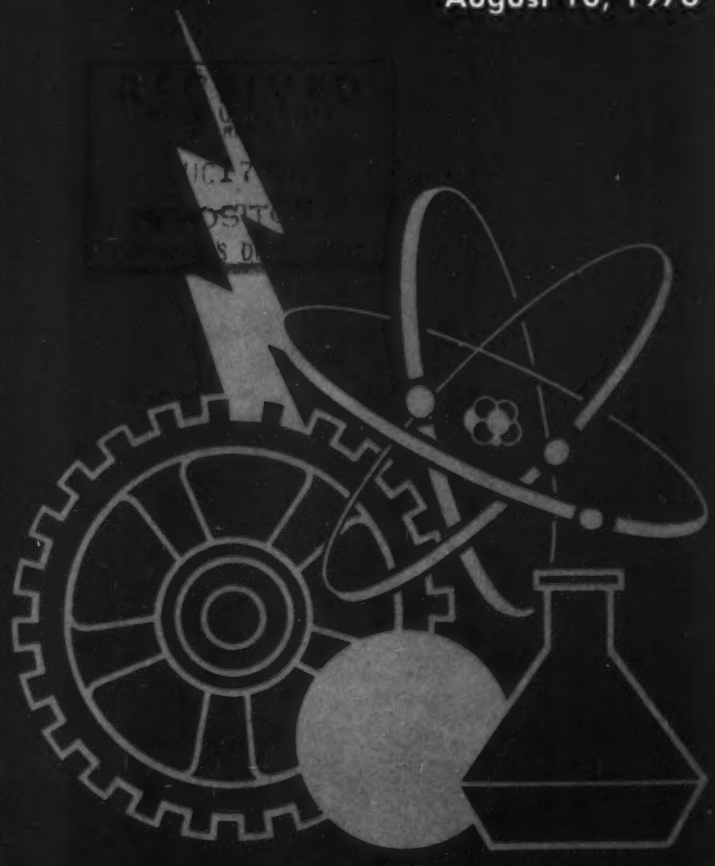
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 10, 1976



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

August 10, 1976 Volume 949 Number 2

CONTENTS

	Page
Patent and Trademark Notices	
Removal from Register	414
Registration to Practice	431
Public Search Room for Patents	431
Patent Suits	432
Patent Notices	
Certificates of Correction for the Week of August 10, 1976	434
Dedications	434
Disclaimers	434
Condition of Patent Applications	435
Reissue Patents Granted (28,924)	436
Plant Patents Granted (3,939)	438
Patents Granted	
General and Mechanical (3,973,275)	439
Chemical (3,973,900)	648
Electrical (3,974,325)	768
Design Patents Granted (240,870)	837
Index of Patentees	PI 1
Index of Reissue Patentees	PI 41
Index of Plant Patentees	PI 41
Index of Design Patentees	PI 41
Classification of	
Patents (Including Reissues)	PI 45
Designs and Plants	PI 47
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 48
Designs and Plants	PI 49

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REMOVAL FROM REGISTER

Pursuant to the provisions of 37 C.F.R. 1.347, a letter was directed on February 12, 1976, to the last post office address furnished to the Committee on Enrollment by each of the persons whose name and address appear on the following list. With respect to some of the letters, no reply was received within the period of forty-five days therein set. Other letters were returned by the Post Office with notations to the effect that the addressee was deceased, unknown, or had moved and left no forwarding address. Accordingly, the names of the following persons are being removed from the Register of Patent Attorneys and Patent Agents.

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Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before August 30, 1976:

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Public Search Room for Patents

Establishment of New Procedures and Revisions of Regulations

One of the major obligations of the Patent and Trademark Office is to make patent information available for public inspection. The quality of this service depends upon promoting an environment conducive to research and maintaining the integrity of the files in the Public Search Room for Patents.

To emphasize our commitment to providing this environment with complete and orderly files for public use, the Patent and Trademark Office is establishing new procedures and revising the Regulations for using the facilities of the Public Search Room for Patents. The new procedures and revised Regulations will become effective August 23, 1976. The new procedures for the Search Room include the requirement that users obtain and show, prior to entering the Search Room facilities, a User Pass. This pass can be obtained at a special desk near the guard station. User Passes will be issued to persons not under prohibition from using the search facilities who agree to abide by the Regulations of the Public Search Room for Patents by signing a statement to that effect. User Passes are non-transferable and are valid until reissue or revocation for cause.

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The revised Regulations for the Search Room appear below, and a reprinting of the Regulations brochure incorporating the revisions will soon be available in the Search Room. The substance of the changes in the procedures and the revised Regulations for the Search Room, as well as any pertinent information that will assist users in the changeover, will be prominently posted in the Search Room. In order to maintain an environment conducive to research, the revised Regulations will be strictly enforced.

Although these new procedures and revised Regulations may cause some inconvenience, it is hoped that with your understanding and cooperation they will result in improvement in search facilities which will benefit all participants in our patent system.

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The Public Search Room for Patents is defined as that area comprising the foyers off the lobbies of Buildings 3 and 4 of Crystal Plaza; the offices, Microfilm Center, restrooms and telephone areas off these foyers; the stacks, Record Room, study and copier areas between the foyers; and the Mezzanine.

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15. Users of the Public Search Room for Patents are not permitted to use Patent and Trademark Office facilities beyond the Search Room after 5:00 p.m.
16. The front portion of the Public Search Room for Patents, i.e., that portion facing Crystal Plaza Drive and having a high ceiling, shall not be occupied by users after 6:00 p.m.
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Persons violating these regulations may be denied the use of the facilities in the Public Search Room for Patents, and may further be subjected to prosecution under the Criminal Code. Additionally, the name of any person violating these regulations who is registered to practice before the Patent and Trademark Office may be forwarded to the Solicitor for appropriate action under 37 CFR 1.348.

C. MARSHALL DANN,
July 9, 1976. *Commissioner of Patents and Trademarks.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,610,167, T. A. Te Grotenhuis, PIGMENTED SILICONE ELASTOMERS; **2,742,378**, same, FILLERS HAVING VINYL SILOXANE GROUPS BONDED TO THE SURFACE THEREOF WITH ETHYLENICALLY UNSATURATED POLYMERIZABLE MONOMERS; **2,841,566**, same, HIGH POLYMERS WITH CHEMICALLY BONDED REINFORCING AND METHOD OF MAKING SAME, **filed** Oct. 25, 1967, D.C., N.D. Ohio (Cleveland) Doc. C67–775, *Westwood Chemical, Inc.* v. *Union Carbide Corp.* Stipulation and order dismissing case, with prejudice, Mar. 30, 1976.

2,742,378. (See 2,610,167.)

2,841,566. (See 2,610,167.)

2,966,718, D. H. Dave, METHOD FOR THE INSTALLATION OF REINFORCED CONCRETE FLOORS IN MULTISTORIED BUILDINGS; **3,037,259**, same, APPARATUS FOR THE INSTALLATION OF REINFORCED CONCRETE FLOORS IN MULTISTORIED BUILDINGS, **filed** Apr. 6, 1976, D.C., S.D.N.Y. Doc. 76–C–1574, *D. H. Dave* v. *The Ceco Corporation et al.*

3,687,250. (See 2,906,718.)

3,282,761, Allen and Burness, HARDENING OF PHOTOGRAPHIC GELATIN LAYERS; **Re. 26,601,** same, **filed** Apr. 5, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76–333, *Picker Corporation and Picker Chemicals* v. *Eastman Kodak Company.*

3,578,452, K. Parker, DEVELOPING COMPOSITIONS FOR DIAZOTYPE MATERIALS, **filed** Jan. 7, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c41, *Addressograph Multigraph Corp.* v. *Sheffield S. Campbell and Campbell Assoc.* Dismissal of action, the parties to this action hereby stipulate and move the Court for entry of an order dismissing the action with prejudice, Apr. 14, 1976.

3,588,095, Ward, Ward and Bachmann, SUCTION TABLE SYSTEM FOR FEEDING OF WARPED SHEETS, **filed** July 2, 1972, D.C. Md. (Baltimore) Doc. H–72–683, *The Ward Machinery Company* v. *Wm. C. Staley Machinery Corporation.* Judgment, Claims 1 through 4, both inclusive, 6, 7, 14, and 15 of said patent are invalid. Complaint of the plaintiff is hereby dismissed, Mar. 8, 1976.

3,624,344, L. G. Kutzer, ATTACHMENT OF NON-METALLIC ARTICLES TO METALLIC SUBSTRATES, **filed** Apr. 12, 1976, D.C. Del. (Wilmington) Doc. 76–139, *Carborundum Co.* v. *Combustion Engineering, Inc.*

3,640,595, Staller and Staller, MOTORIZED MOBILE SHELVING UNITS, **filed** Apr. 1, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV–76–1070, *IPC, Inc.* v. *Spacesaver Corp.*

3,648,939, K. I. J. Rosen, YARN STORING DEVICE, **filed** Nov. 8, 1973, D.C.R.I. (Providence) Doc. 5362, *Karl Isac Joel Rosen and AB Iro* v. *Lawson-Hemphill, Inc.* Judgment is hereby rendered for the plaintiffs on their complaint, Apr. 14, 1976.

3,700,796, D. E. Griffey, D-C COUPLED SYNC CLIPPING VIDEO AMPLIFIER, **filed** Apr. 9, 1976, D.C. Del. (Wilmington) Doc. 76–138, *Mobil Oil Corporation* v. *E. I. du Pont de Nemours & Co., Inc.*

3,741,233, R. P. Smith, Jr., LEAK PREVENTION SYSTEM FOR AN OIL PIPELINE, **filed** July 22, 1975, D.C. Del. (Wilmington) Doc. 75–210, *Craftmaster, Inc.* v. *Alyeska Pipeline Service Company.* Joint motion and order dismissing this action, Apr. 8, 1976.

3,750,726, E. R. Bauchacher, CHIPPING KNIVES FOR CHIPPING HEAD ASSEMBLIES; **Re. 27,654,** Chapman and Hill, CUTTER-HEAD STRUCTURE, **filed** Apr. 13, 1976, D.C., W.D. Wash. (Seattle) Doc. C76–271M, *Hawker Siddeley Canada Ltd.* v. *Disston, Inc.*

3,754,279, Valenti and Follett, THERMAL RECORDER HAVING ANALOGUE STYLUS AND PRINT HEAD, **filed** Apr. 13, 1976, D.C. N.H. (Concord) Doc. C–76–122, *MFE Corporation* v. *Gulton Industries, Inc.*

3,761,994, A. B. Becht, MAGNETIC TAPE HEAD CLEANING APPARATUS, **filed** Apr. 6, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–1116–F, *SSK Enterprises, Inc.* v. *Lafayette Radio Electronics.*

Re. 26,601. (See 3,232,761.)

Re. 27,654. (See 3,750,726.)

3,151,258, Sonderegger and Kistler, DEVICE FOR MEASURING THE FORCES BETWEEN COMPONENTS OF AN ASSEMBLY; **3,673,442,** H. C. Sonderegger, TEMPERATURE COMPENSATED PIEZOELECTRIC ACCELEROMETER, **filed** Mar. 10, 1976, D.C., W.D.N.Y. (Buffalo) Doc. 76–113, *Kistler Instrumente A.G.* v. *PCB Piezotronics, Inc.*

3,241,876, W. S. Saunders, APPARATUS FOR REDUCING LINEAR AND LATERAL WIND RESISTANCE IN A TRACTOR-TRAILER COMBINATION VEHICLE; **3,809,131,** same, MEANS FOR REDUCING LINEAR WIND RESISTANCE IN SINGLE CHASSIS TYPE VEHICLES, **filed** Feb. 5, 1975, D.C., N.D. Ala. (Birmingham) Doc. 75–Go–143–S, *W. Selden Saunders and Rudkin-Wiley Corporation* v. *Avondale Mills; W. W. Murphree, doing business as My Hobby Shop and doing business as Industrial Plastic and Coating.* Final judgment, defendants are hereby permanently enjoined from further infringing said patents, Mar. 18, 1976.

3,247,602, P. K. Davis, PIPE MAKING MACHINE AND METHOD, **filed** Mar. 17, 1976, D.C., N.D. Calif. (Los Angeles) Doc. C–76–0549–SW, *Pacific Roller Die Co., Inc.* v. *Ironside's Machine & Welding, Ltd. et al.*

3,309,131. (See 3,241,876.)

3,502,785, A. D. Nickola, MOUNTING PEDESTAL FOR UTILITIES; **Re. 27,400,** same, **filed** Apr. 18, 1973, D.C., E.D. Mich. (Flint) Doc. 634, *Anne D. Nickola* v. *Kenneth Peterson.* Memorandum opinion and order, defendant's motion for judgment notwithstanding the verdict shall be and hereby is granted, the answers of the jury to interrogatories, numbers 2, 3, 5, 6, and 15, regarding the special verdict on Count I are set aside, claim numbers 4 and 21 of the reissue 27,400 are declared invalid, and defendant's motion for a new trial is denied, Mar. 5, 1976.

3,673,442. (See 3,151,258.)

3,817,326, M. J. Meynier, RAM-TYPE BLOWOUT PREVENTER, **filed** Oct. 3, 1974, D.C., S.D. Tex. (Houston) Doc. CA 74–H–1352, *Cameron Iron Works Inc.* v. *The Rucker Company.*

3,822,754, Henkin and Laby, AUTOMATIC SWIMMING POOL CLEANER, **filed** Jan. 19, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–214–DWW, *Melvyn L. Henkin and Jordan M. Laby* v. *Swimrite Mfg. Co., Inc. and Swimrite, Inc.*

3,845,389, Phillips and Brady, HELMET TRANSCEIVER ASSEMBLY FOR A FIREMEN'S HELMET ASSEMBLY OR THE LIKE, **filed** Feb. 25, 1975, D.C., C.D. Calif. (Los Angeles) Doc. CV 75–625 AAH, *Theodore Liebman et al.* v. *American Lighting Specialties.* Filed consent decree and judgment and order thereon that plaintiff is owner of said patent. Defendant has infringed on said patent and is enjoined from further use of said patent. Judgment is entered in favor of plaintiff and against defendant, Jan. 9, 1976.

3,849,728, A. Evans, FIXED POINT PROBE CARD AND AN ASSEMBLY AND REPAIR FIXTURE, **filed** Aug. 15, 1975, D.C., N.D. Tex. (Dallas) Doc. CA3–75–1001–G, *Wentworth Laboratories, Inc.* v. *Electroglas, Inc. and Rucker & Kolls.*

3,854,212, R. A. Rose, FOOT MEASURING DEVICE, **filed** July 22, 1975, D.C., S.D. Ill. (Peoria) Doc. P–C–75–0067, *Robert A. Rose, doing business as Family Foot Fitter* v. *Foster & Gallagher, Inc.*

3,874,706, J. F. Arnold, FLUID ACTUATED PIPE CONNECTION, **filed** Dec. 18, 1975, D.C., S.D. Tex. (Houston) Doc. 75–H–2156, *Hydrotech International, Inc. et al.* v. *Comex Marine Services, Inc. et al.*

3,874,988, Buff, French and Pollock, MANUFACTURE OF EXPANDED CELLULAR PRODUCTS, **filed** Apr. 1, 1975, D.C. Md. (Baltimore) Doc. HM–75–394, *Tenneco Chemicals, Inc.* v. *William T. Burnett & Co., Incorporated.*

3,879,188, Fritz, Evans and Cooke, GROWTH REGULATION PROCESS, **filed** June 17, 1975, D.C., E.D. Pa. (Philadelphia) Doc. 75–1730, *GAF Corporation* v. *Amchem Products, Inc.*

Re. 27,400. (See 3,502,785.)

PATENT NOTICES

Certificates of Correction for the Week of Aug. 10, 1976

Re. 28,726	3,886,742	3,932,482	3,950,061
D. 226,807	3,889,312	3,932,559	3,950,281
D. 235,659	3,891,477	3,932,585	3,950,341
D. 239,441	3,891,830	3,932,603	3,950,405
3,441,441	3,893,512	3,933,670	3,950,436
3,451,962	3,893,573	3,933,740	3,950,450
3,499,302	3,893,693	3,933,853	3,950,494
3,515,671	3,894,092	3,933,997	3,950,743
3,543,241	3,894,580	3,934,201	3,951,043
3,555,274	3,894,906	3,935,074	3,951,192
3,594,237	3,900,565	3,935,165	3,952,008
3,646,262	3,901,703	3,935,186	3,952,181
3,737,548	3,901,902	3,935,624	3,952,402
3,741,977	3,903,164	3,936,421	3,952,482
3,755,078	3,904,309	3,936,657	3,952,976
3,756,990	3,905,991	3,937,791	3,953,169
3,769,880	3,906,010	3,938,144	3,953,295
3,799,057	3,906,090	3,938,880	3,953,363
3,802,598	3,907,309	3,939,069	3,953,458
3,810,090	3,908,114	3,939,155	3,953,704
3,819,332	3,910,903	3,939,346	3,953,763
3,819,768	3,912,100	3,940,794	3,954,288
3,822,994	3,912,744	3,941,776	3,954,461
3,829,095	3,913,449	3,941,914	3,954,525
3,831,363	3,913,831	3,942,158	3,954,530
3,833,715	3,913,968	3,942,558	3,954,979
3,835,180	3,914,218	3,943,021	3,955,304
3,835,185	3,915,593	3,943,050	3,955,439
3,836,591	3,915,635	3,943,506	3,955,618
3,836,664	3,915,730	3,943,583	3,955,720
3,838,163	3,915,821	3,943,719	3,955,740
3,847,949	3,915,998	3,944,006	3,956,142
3,849,399	3,916,123	3,944,480	3,956,319
3,849,768	3,916,436	3,944,513	3,956,464
3,850,177	3,917,189	3,944,655	3,956,791
3,850,435	3,917,321	3,944,831	3,956,816
3,853,848	3,917,778	3,944,944	3,957,583
3,853,871	3,917,822	3,945,549	3,957,736
3,853,937	3,918,922	3,945,686	3,957,785
3,855,213	3,919,445	3,945,766	3,957,958
3,855,792	3,920,607	3,946,033	3,958,059
3,856,620	3,920,629	3,946,193	3,958,062
3,856,640	3,921,788	3,946,365	3,958,383
3,857,695	3,922,295	3,946,431	3,958,722
3,860,579	3,923,470	3,946,620	3,959,004
3,860,739	3,923,788	3,946,673	3,959,068
3,861,226	3,924,891	3,946,890	3,959,160
3,862,161	3,925,319	3,947,336	3,959,237
3,864,387	3,925,480	3,947,384	3,959,595
3,864,870	3,927,065	3,947,974	3,959,660
3,866,851	3,928,090	3,948,172	3,960,064
3,869,477	3,928,285	3,948,259	3,960,430
3,870,790	3,928,326	3,948,285	3,960,485
3,871,341	3,928,349	3,948,586	3,960,651
3,873,271	3,929,105	3,948,697	3,960,722
3,873,713	3,929,676	3,948,823	3,960,840
3,876,510	3,929,758	3,949,002	3,960,910
3,877,224	3,929,921	3,949,158	3,961,015
3,878,072	3,929,922	3,949,163	3,961,062
3,881,496	3,929,996	3,949,222	3,961,712
3,886,150	3,931,173	3,949,266	3,962,612

Dedication

3,565,885.—*Hyman Max Molotsky*, Chicago, and *Arthur Kott*, Oak Forest, Ill. PREPARATION OF COLOR STABLE GLYCOSIDES. Patent dated Feb. 23, 1971. Dedication filed June 10, 1976, by the assignee, *CPC International Inc.*

Hereby dedicates to the public the entire term of said patent.

Disclaimers

3,635,957.—*Guido R. Genta*, Lock Haven, Pa. STYRYL DYES. Patent dated Jan. 18, 1972. Disclaimer filed May 5, 1976, by the assignee, *American Color & Chemical Corporation.*

Hereby enters this disclaimer to claim 2 of said patent.

3,641,221.—*Gerhard Schrader*, Wuppertal-Cronenberg, *Ingeborg Hammann*, Cologne, and *Wilhelm Stendel*, Wuppertal-Vohwinkel, Germany. O-ALKYL-O-ARYL-THIOLPHOSPHORIC ACID ESTERS. Patent dated Feb. 8, 1972. Disclaimer filed May 26, 1976, by the assignee, *Bayer Aktiengesellschaft.*

Hereby enters this disclaimer to claims 1, 3 and 4 of said patent.

3,653,065.—*Arling Dix Brown, Jr.*, Cleveland Heights, Ohio. ELECTROGRAPHIC RECORDING SYSTEM WITH INTERLEAVED ELECTRODE GROUPS. Patent dated Mar. 28, 1972. Disclaimer filed May 26, 1976, by the assignee, *Gould Inc.*

Hereby enters this disclaimer to claims 2, 3, 4, and 5 of said patent.

3,654,349.—*Tsung-Ying Shen*, Westfield, N.J., *Richard B. Greenwald*, Framingham, Mass., *Howard Jones*, Matawan, *Bruce O. Linn*, *Sommerville*, and *Bruce E. Witzel*, Westfield, N.J. SUBSTITUTED INDENYL ACETIC ACIDS. Patent dated Apr. 4, 1972. Disclaimer filed May 12, 1976, by the assignee, *Merck & Co., Inc.*

Hereby enters this disclaimer to claim 11 of said patent.

3,680,975.—*William F. Smith* and *John H. Mitchell*, both of Lake Jackson; *William M. Edwards*, Freeport, and *Philip W. Coz*, Brazoria, Tex. ROLL PUMP FOR HIGHLY VISCOUS MATERIAL. Patent dated Aug. 1, 1972. Disclaimer filed Mar. 17, 1975, by the assignee, *The Dow Chemical Company.*

Hereby enters this disclaimer to claims 1–4 of said patent.

3,725,266.—*Joseph M. Haviland*, Grand Rapids, Mich. PROCESS FOR REMOVING METAL COMPOUND CONTAMINANTS FROM WASTE WATER. Patent dated Apr. 3, 1973. Disclaimer filed June 4, 1976, by the assignee, *Haviland Products Company.*

Hereby enters this disclaimer to claims 1–9 of said patent.

3,900,409.—*Raymond S. Dalter*, Montgomery, and *Sidney S. White*, Westchester, Ohio. LUBRICATING OIL COMPOSITIONS CONTAINING SULFUR-CHLORINATED STYRENE DERIVATIVES. Patent dated Aug. 19, 1975. Disclaimer filed June 28, 1976, by the assignee, *Cincinnati Milacron Chemicals, Inc.*

Hereby enters this disclaimer to claims 1–9 and 14–16 of said patent.

3,948,444.—*Kenneth E. Reed*, St. Charles, Iowa. LOW DRIFT SPRAY METHOD. Patent dated Apr. 6, 1976. Disclaimer filed June 3, 1976, by the assignee, *Delavan Manufacturing Company.*

The term of this patent subsequent to Apr. 6, 1993, has been disclaimed.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 30, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur: Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-2-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-1-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-17-75
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director... Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	12-17-75
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director.... Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	5-21-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-3-75
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	9-19-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director.. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-2-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-6-75
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	4-14-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-24-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director.. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	2-3-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-15-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-25-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	12-8-75

Expiration of patents: The patents within the range of numbers indicated below expire during July 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,893,005 to 2,897,499 inclusive
Plant Patents..... Numbers 1,850 to 1,855 inclusive

REISSUES

AUGUST 10, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

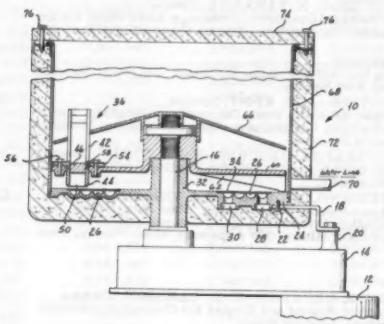
Re. 28,924
PLATE TYPE ICE MAKER

Charles G. Neumann, Palatine; Harvey R. Krueger, Dundee, and Walter Panock, Addison, all of Ill., assignors to Reynolds Products Inc., Schaumburg, Ill.

Original No. 3,803,869, dated Apr. 16, 1974, Ser. No. 327,985, Jan. 30, 1973. Application for reissue Mar. 11, 1975, Ser. No. 557,410

Int. Cl.² F25C *1/14*

U.S. Cl. 62—320 22 Claims



1. Apparatus for forming hard pieces of ice including in combination, means forming an extended freezing surface, means forming an extruding passage having an entry and an exit *and a bottom extending upwardly and away from said surface*, a gathering edge *provided on said passage forming means for movement therewith* adjacent to said entry, and means mounting said passage forming means for movement relative to said surface with said gathering edge adjacent to said surface to remove ice crystals from a film of ice on said surface and to deliver said ice crystals to said entry in the form of slush ice, *said passage forming means being provided with means for exerting a compressive force on slush ice delivered thereto so that slush ice* which enters said passage [and] emerges from said exit in the form of a hard rod of ice in response to relative movement between said passage forming means and said surface.

Re. 28,925
NEUTRON METHOD FOR DETERMINING RESIDUAL OIL-PHASE FLUID CONCENTRATION

James R. Jorden, Jr., Houston, Tex., and Forrest R. Mitchell, Metaire, La., assignors to Shell Oil Company, Houston, Tex.

Original No. 3,631,245, dated Dec. 28, 1971, Ser. No. 786,132, Dec. 23, 1968. Application for reissue Dec. 17, 1973, Ser. No. 425,342

Int. Cl.² G01V *5/00*

U.S. Cl. 73—152 15 Claims

14. A method of measuring water saturation in a subsurface zone penetrated by a well bore which comprises the steps of:

1. measuring the water saturation of the rock in said zone adjacent said well bore,

2. thereafter reducing to zero the oil saturation of the rock immediately surrounding the well bore,

3. filling the pore space of the rock adjacent the well bore with a fluid having the same logging characteristics as the water in the rock at the time of Step (1),

4. after Step 3 again measuring the water saturation of the rock in said zone adjacent said well bore.

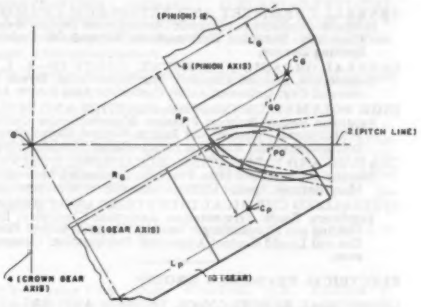
Re. 28,926
GEAR TOOTH DESIGN

Meriwether L. Baxter, Jr., Brighton, N.Y., assignor to The Gleason Works, Rochester, N.Y.

Original No. 3,820,414, dated June 28, 1974, Ser. No. 357,036, May 3, 1973. Continuation-in-part of Ser. No. 274,157, July 24, 1972, abandoned. Application for reissue Mar. 21, 1975, Ser. No. 561,011

Int. Cl.² F16H *55/06, 1/14*

U.S. Cl. 74—462 11 Claims



1. A gear of a mating gear pair having engaging tooth profiles, said gear comprising tooth and slot configurations in which:

a. the root lines are concave curves,

b. the topland surfaces of the teeth are convex curves, [substantially parallel to the root lines of the mating gears]

c. the maximum tooth height is substantially at mid-length of each tooth,

d. said tooth height reduces substantially to zero at the length extremities, and

e. the working areas of [the teeth] *each tooth* are inclined *depthwise* to the pitch [line] *element*.

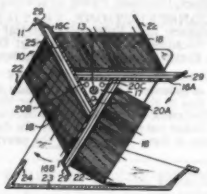
Re. 28,927
ROTARY CARD FILE

Albert Karper, 5700 Collins Ave., Miami Beach, Fla. 33140

Original No. 3,734,587, dated May 22, 1973, Ser. No. 211,420, Dec. 23, 1971. Application for reissue Apr. 4, 1975, Ser. No. 565,322

Int. Cl.² A47B *63/00*; A47F *3/14*

U.S. Cl. 312—186 10 Claims



1. A rotary card file which comprises a base means, a card holder supported by said base means for rotation relative thereto about a given axis, and including a plurality of card holding [trays extending in generally parallel relation] *arms*

disposed generally radially to said axis, retainer means on each tray disposed to retain the cards in alignment when the [tray] *arm* is in an upwardly facing position, and to support the cards suspended from the [tray] *arm* when same is in a downwardly facing position, and a card protector carried by each [tray] *arm* and disposed to extend beyond the cards carried thereby, and to engage the base means to compress the cards [of the tray] *on the arm* into a compacted stacked relation when the [tray] *arm* is turned to a downwardly facing position.

Re. 28,928

INTEGRATED CIRCUIT COMPRISING SUPPLY POLARITY INDEPENDENT CURRENT INJECTOR

Cornelis Maria Hart, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Original No. 3,829,718, dated Aug. 13, 1974, Ser. No. 320,964, Jan. 4, 1973. Application for reissue Oct. 14, 1975, Ser. No. 622,094

Claims priority, application Netherlands, Jan. 8, 1972, 7200294

Int. Cl.[2] H03K *3/26, 19/08*

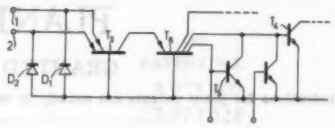
U.S. Cl. 307—304 **24 Claims**

11. An integrated circuit, comprising:

a. at least one circuit element;

b. bias supply terminals for biasing said circuit element; and

c. means for automatically ensuring the appropriate polarity bias to said circuit element, said means comprising a bridge rectifier circuit electrically connected to said terminals and that comprises in each of two arms thereof a current injector coupled to said bias receiving circuit element, said current injectors comprising respective rectifying junctions, which, upon forward biasing, can inject carriers from a region outside said circuit element and cause collection of carriers by an active zone of said circuit element so as to bias said circuit element.



PLANT PATENTS

GRANTED AUGUST 10, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,939

PASPALUM VAGINATUM GRASS PLANT

Hubert F. Whiting, 81–301 Avenue 50, Indio, Calif. 92201

Filed Sept. 29, 1975, Ser. No. 617,588
Int. Cl.[3] A01H *5/00*
U.S. Cl. Plt.—88 **1 Claim**

1. A new variety of *Paspalum vaginatum* grass plant herein shown and described characterized by: dense uniform intertwining low growing leaves of grass spreading by stolons and rhizomes; in unmown condition the grass plant producing few seed heads, in regular periodic mowing conditions (7–10 days) virtually no seed heads are produced between mowing whereby a low growing dense turf grass surface is established without seed heads, increased resistance and tolerance to drought and cold.

PATENTS

GRANTED AUGUST 10, 1976

ERRATA

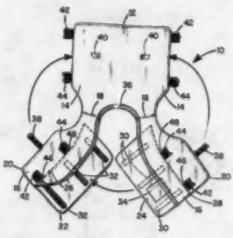
For CLASS	See PATENT NO.
210-136	3,973,407
132-011 R	3,973,528
132-007	3,973,574
037-058	3,973,575
195-080 R	3,973,608
235-092 PC	3,973,725
235-092 A	3,973,726
224-001 B	3,973,776
029-157.3 D	3,973,918
062-003	3,973,938
096-100	3,973,979
157-001.1	3,974,005
526-014	3,974,128
204-159.24	3,974,129
526-263	3,974,131
526-020	3,974,132
526-344	3,974,133
536-010	3,974,137
536-004	3,974,138
536-084	3,974,139
236-001 C	3,974,427

PATENTS

GRANTED AUGUST 10, 1976

GENERAL AND MECHANICAL

3,973,275
ARMORED GARMENT
Maurice Blauer, 31 Dunbarton Road, Belmont, Mass. 02178
Filed Aug. 28, 1975, Ser. No. 608,653
Int. Cl.² F41H *1/02*
U.S. Cl. 2—2.5 **7 Claims**



1. An armored garment for protection of a wearer from injury by projectiles, said garment comprising:

a unitary back panel configured to cover the width of the back and extending from the shoulders to the waist of a wearer, said back panel having forward extensions on each side to cover the sides of the wearer between the axilla and the waist;

a unitary left side-front panel secured to said back panel at the left shoulder and configured to extend from the shoulder over the lateral portion of the wearer's chest and ribs to the waist, said left side-front panel having a rearward extension to cover the wearer's left side between the axilla and the waist;

a unitary right side-front panel secured to said back panel at the right shoulder and configured to extend from the shoulder over the lateral portion of the wearer's chest and ribs to the waist, said right side-front panel having a rearward extension to cover the wearer's right side between the axilla and the waist;

means for flexibly securing said side-front panels to said back panel at the sides in sliding overlapping relationship;

a unitary left central-front panel secured to said left said-front panel and configured to extend from the neck to the waist over the wearer's chest and stomach;

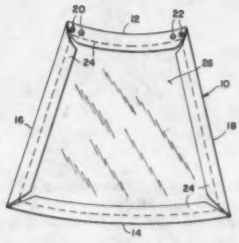
a unitary right central-front panel secured to said right side-front panel and configured to extend from the neck to the waist over the wearer's chest and stomach; and

means for removably securing said left and right central-front panels in overlapping relationship over the wearer's chest and stomach to close the vest completely around the wearer's torso and to provide double thickness protection therefor;

each of said back, left and right side-front and left and right central-front panels being formed of multiple layers of ballistic fabric material enclosed by at least one layer of tough, wear-resistant cover fabric.

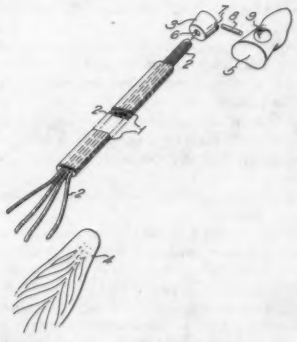
3,973,276
INCONTINENT'S BED WRAP
Bernice Moses, Rosedale, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed July 17, 1975, Ser. No. 596,731
Int. Cl.² A41D *1/14*
U.S. Cl. 2—215 **1 Claim**

1. An incontinent's bed wrap skirt comprising: a generally trapezoidal sheet of substantially water impervious material; mutually engageable fastener means carried at a pair of corners bounding a narrowest edge of said sheet for securing said narrowest edge around the waist of a user; said sheet having a back side adapted to face the body of the user; a disposable



absorbent pad of trapezoidal shape and of substantially the same size as said sheet; and flaps along each edge of said sheet folded over to said back side forming a peripheral frame for receiving and removeably retaining said pad as a lining along substantially the entire back side of said sheet.

3,973,277
ATTACHING FIBROUS CONNECTIVE TISSUE TO BONE
James Campbell Semple, 59 Hamilton Drive, Glasgow G.12, Scotland, and Gordon Arthur William Murray, 14 W. End, Long Whatton, Loughborough, Leics. LE12 5DW, England
Filed Jan. 23, 1975, Ser. No. 543,625
Claims priority, application United Kingdom, Jan. 30, 1974, 4280/74
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1 **12 Claims**



1. A prosthesis which comprises artificial fibrous connective tissue and, at a distal end of said tissue, a bone implant comprising a tapered porous plug, said plug being connected to said artificial tissue with said plug tapering in the direction towards said artificial tissue.

3,973,278
ARTIFICIAL HIP-JOINT

Yakov Isaevich Shersher, 1 Degtyarny proezd, 3, kv. 42, Saratov, U.S.S.R.

Filed June 27, 1975, Ser. No. 591,111
Claims priority, application U.S.S.R., July 8, 1974, 2036651
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.912 1 Claim

1. An artificial hip-joint, comprising an endoprosthesis of the acetabulum formed as a seat whereof the exterior surface is formed as tierwise arranged blades with sharp edges having holes formed therein wherethrough burgeoning bony tissue may advance; and endoprosthesis of the proximal portion of the femur articulated with said endoprosthesis of the acetabulum; a spherical head of said endoprosthesis of the proximal portion of the femur; a slot formed in said spherical head and broadening toward the interior of said head; a neck of said endoprosthesis of the proximal portion of the femur installed in said slot formed in said spherical head; a slot axially formed at the end of said neck; a taper pin installed in said slot formed in said neck with the widening portion of said taper pin facing outward, the height of said taper pin exceeding the depth of said slot formed in the neck; an intramedullar nail of said endoprosthesis of the proximal portion of the femur which smoothly turns into said neck, said spherical head serving to provide said articulation of said endoprosthesis of the acetabulum with said endoprosthesis of the proximal portion of the femur.

3,973,279
SINK SHAMPOO UNIT

Herbert F. Giffen, 1401 E. Burton, Anaheim, Calif. 92805

Filed Aug. 22, 1975, Ser. No. 606,752
Int. Cl.² A47K 3/12; A61H 35/00; A47K 3/03, 3/18
U.S. Cl. 4—159 6 Claims

1. A sink shampoo unit that includes a portable spray head assembly and container thereof, said container serving to removably hold said spray head assembly when the latter is not in use and as a drain board that is removably disposed at an angle in a sink to direct water into said sink when said spray head assembly is used for a shampoo by being connected to a faucet operatively associated with said sink, said combination including:

a. a spray head having a water inlet and a plurality of spaced water outlets;

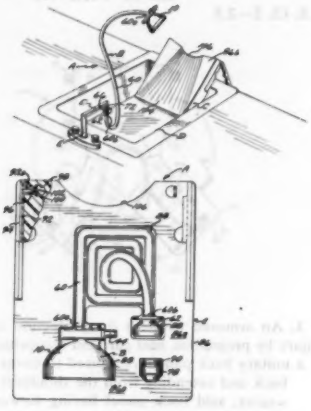
b. a reservoir for a liquid cleanser on said spray head;

c. spring loaded manually operated valve means on said spray head that is normally in a first position to obstruct communication between said inlet and outlets, said valve means including a movable metering chamber that is in communication with said reservoir when said valve means is in said first position, said valve means when in a second position establishing communication between said inlet and said outlets, and said valve means when in a third position establishing communication between said inlet and said outlets and injecting a metered quantity of said liquid cleanser from said metering chamber into water as the latter flows through said spray head to discharge as a spray from said outlets;

d. a pliable hose having first and second ends, said first end connected to said water inlet on said spray head;

e. first means on said second end of said hose for removably connecting said hose to said faucet;

f. a container in the form of a substantially rectangular body that has first and second oppositely disposed sides, a plurality of spaced recesses in said first side in which said spray head, hose and first means are contained when not in use, and a longitudinal channel formed in said second side; and

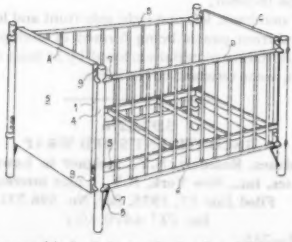


g. pivotally supported leg means on said container for holding the latter in an inclined position on said sink, with said second side facing upwardly for said channel to direct water discharged from said spray head downwardly into said sink after said spray head, hose and first means are removed from said cavities to have said first means connected to said faucet and said spray head used for shampoo purposes on the hair of the head of a user when said hair and head are disposed above said inclined second side.

3,973,280
SLIDING PANELS DISMOUNTABLE BED

Marcel Mathou, Zone Industrielle d'Onet le Chateau, 12000 Rodez, France

Filed Dec. 24, 1974, Ser. No. 536,209
Claims priority, application France, Dec. 28, 1973, 73.47036
Int. Cl.² A47C 29/00
U.S. Cl. 5—99 B 6 Claims



1. A dismountable bed, in particular for children, comprising:

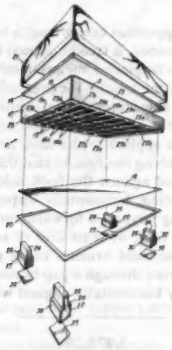
an upright head panel at one end;
an upright foot panel at the other end;
two side panels interconnecting opposite sides of said head and foot panels;
each of said head and foot panels comprising two vertical posts and a cross-piece disposed between said posts, the side edges of said cross-piece being, at least at some location therealong, spaced from said posts defining an interval therebetween,
each of said side panels including at each of their lateral ends at least two tips adapted to engage said vertical posts,
each of said tips comprising means for preventing disengagement of said side panel tips with said posts when the angle of the dihedral formed by the planes of said side panel and the adjacent head or foot panel is substantially equal to 90°, and for allowing disengagement when the angle is substantially different from 90°,
said means comprising a recess in said tip for engaging said vertical post and a lateral aperture through which said vertical post passes into said recess,
said aperture facing away from said cross-piece when the bed is in the operative position in which said dihedral angle is substantially 90°; and
substantially rectangular, removable mattress support means, located between said head, foot and side panels, for maintaining the bed in the operative position in which said dihedral angle is substantially 90°.

3,973,281

MOLDED EXPANDED POLYSTYRENE BED ASSEMBLY

William R. Davis; Joel T. Davis, and William P. Davis, all of Rte. 2, Cave Spring, Ga. 30124

Filed Dec. 6, 1974, Ser. No. 530,058
Int. Cl.² A47C *19/00, 7/00*
U.S. Cl. 5—131 15 Claims



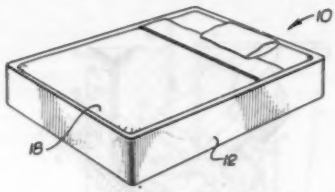
1. In a bed having a frame and a mattress, a mattress support supporting said mattress and connected to said frame, the improvement comprising said mattress support being composed of a substantially rigid, unitary structure of expanded polystyrene and a reinforcing sheet of web material secured to and extending across the bottom surface of said mattress support.

3,973,282

WATER BED LINER HOLDER

Marvin I. May, 960 Second St., Hermosa Beach, Calif. 90254

Filed Oct. 15, 1975, Ser. No. 622,677
Int. Cl.² A47C *27/08*
U.S. Cl. 5—370 13 Claims



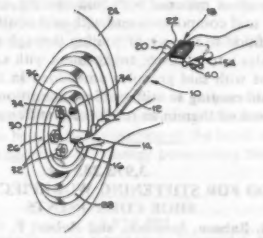
1. A liner holder to be attached to a frame of a water bed along its interior surface for restraining a waterproof liner placed within the interior of the frame, the liner forming with the frame a safety reservoir should the water bed rupture, the holder comprising:
a base of resilient material, said base being bowed to form with said frame a space for storage of a portion of said liner;
a leg portion connected to said base for bearing against said frame to help secure said holder in place; and
a head portion connected to said base for bearing against said frame, with said liner being receivable between said head portion and said frame.

3,973,283

TIRE CHANGE ASSIST TOOL

Arnold Boe, Box F, Laie, Hawaii 96762

Filed Nov. 17, 1975, Ser. No. 632,238
Int. Cl.² B60B *29/00*
U.S. Cl. 7—1 E 10 Claims



1. Tire change assist tool to facilitate mounting and demounting a wheel-carried tire on axle lugs, said tool comprising an axially elongated rigid bar; means forming a wrench socket at one end of said bar adapted for axle lug nut engagement, means defining a fulcrum axially of said bar and terminally opposite the socket end thereof; and bar side arm means between the bar ends operatively associated with said fulcrum means to support said wheel and tire for universal movement in ground-elevated relation responsive to said bar pivoting on said fulcrum and within the wheel locus of registration with said axle lugs.

3,973,284

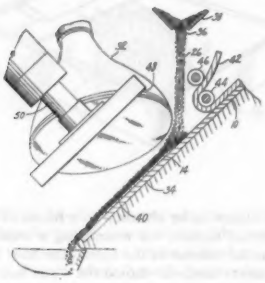
METHODS OF STIFFENING A SHOE COMPONENT

Albert E. Newton, Beverly; Roger L. Farnum, Peabody, and Nicholas J. Gelsomini, Ipswich, all of Mass., assignors to USM Corporation, Boston, Mass.

Continuation of Ser. No. 399,464, Sept. 20, 1973, abandoned. This application Mar. 18, 1975, Ser. No. 559,584

Int. Cl.[2] A43D *00/00*

U.S. Cl. 12—146 D 8 Claims



1. The method for stiffening a selected area of a shoe component of flexible sheet material comprising the steps of applying, in hot viscous molten state, a coating of synthetic polymeric material which will harden to stiff, resilient condition on the selected area of said shoe component, said coating being restricted to said selected area, applying free granules of rigid material of which the surface is readily wet by said molten material of the coating while exposed portions of the coating are in heated softened adhesive condition to cause said granules to adhere to said coating in a uniform single layer of granules, said granules having a size of at least about one-half the thickness of the coating and being present in amount of from about one-half up to a weight about equal to the weight of the polymeric material, said material being substantially harder than said polymeric material at the temperature of use of said shoe component and not being softened to freely fluid state by the heat of said molten material, pressing said first shoe component aainst a second shoe component of flexible sheet material with said coating and granules between the said components and with said coating in heat-softened condition to force said coating through spaces between said granules into adhesive engagement with said second shoe component with said granules embedded in the coating and cooling said coating to stiff resilient condition with said rigid granules locked therein as reinforcing stiffening bodies.

3,973,285

METHOD FOR STIFFENING WORKPIECES SUCH AS SHOE COMPONENTS

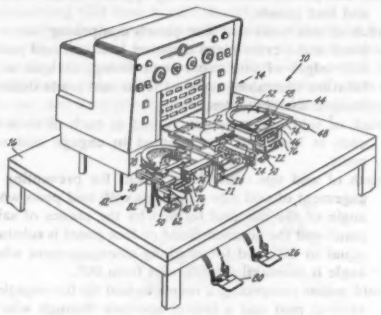
Edward S. Babson, Ipswitch, and Robert F. Gorini, Beverly, both of Mass., assignors to USM Corporation, Boston, Mass.

Division of Ser. No. 538,819, Jan. 6, 1975. This application Oct. 28, 1975, Ser. No. 625,931

Int. Cl.[2] A43D *00/00*

U.S. Cl. 12—146 D 3 Claims

1. The method of stiffening a predetermined portion of the upper of a shoe or the like which consists in depositing a molten charge of viscous thermoplastic stiffening material on a flat release surface corresponding in shape to that of said portion, cooling the charge in its under layer only in portions in contact with said flat surface and at a rate greater than its upper layer whereby peripheral portions of the latter are not chilled, causing said predetermined portion to be drawn taut and pressed into register and intimate contact with said upper layer while the upper layer is still molten or at least tacky, and then effecting separation of the upper from the release surface



with the entire charge adhered to the predetermined portion of the upper.

3,973,286

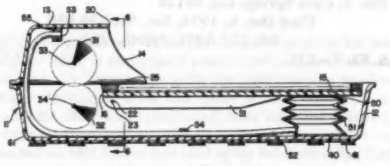
FOOT CLEANING APPARATUS HAVING SOAP SUPPLY AND BRUSHING MEANS

Corrigan D. Logan, Tuscaloosa, Ala., assignor to Logan Enterprises Inc., Demopolis, Ala.

Filed Jan. 22, 1975, Ser. No. 543,160

Int. Cl.[2] A47K *7/03;* A61H *33/00*

U.S. Cl. 15—21 D 6 Claims



5. Foot cleaning apparatus comprising a housing for receiving the foot to be cleaned, a treadle in said housing on which the foot is adapted to be placed, means in said housing responsive to depression of the treadle for pressurizing a foot cleaning solution, means responsive to the solution being pressurized for dispensing the solution into the housing so that the dispensed solution is applied to the foot, and brush means in the housing for scrubbing the foot so that the dispensed cleaning solution is rubbed against the foot; said brush means includes a pair of mating, horizontally disposed brushes positioned in the housing beyond a forward end of the treadle to receive toes of the foot, at least one of said brushes being horizontally rotatable, said brushes being positioned so that the toes can be inserted through a gap between them, said gap being approximately horizontally aligned with the treadle.

3,973,287

HEADLAMP WIPER ASSEMBLIES

Robert John Lane, Birmingham, England, assignor to Joseph Lucas (Electrical) Limited, Birmingham, England

Filed Dec. 8, 1972, Ser. No. 313,570

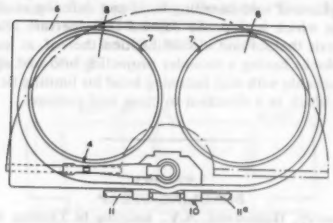
Claims priority, application United Kingdom, Dec. 8, 1971 56917/71

Int. Cl.[2] B60S *1/20*

U.S. Cl. 15—250.25 5 Claims

1. A headlamp wiper assembly for a twin headlamp unit comprising a backing plate having a pair of spaced headlamp apertures therein to accommodate the twin headlamp units said headlamp apertures having axes extending perpendicularly with respect to a plane in which the headlamp aperture

lie, a bearing unit fixed relative to said backing plate, a shaft mounted in said bearing unit for angular oscillatory movement and extending through a further aperture in said backing plate, said further aperture being disposed between said pair



of headlamp apertures and offset from a plane in which said axes lie, and a single wiper mounted on said shaft, and means for oscillating said shaft through a large angle such that said single wiper wipes both headlamps in use.

3,973,288

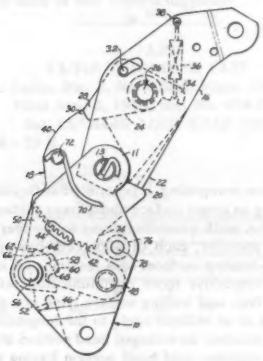
SEAT RECLINER

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Detroit, Mich.

Filed Feb. 26, 1975, Ser. No. 552,974

Int. Cl.² E05D *11/10*

U.S. Cl. 16—146 **20 Claims**



1. Adjustable seat back support structure comprising

a fixed support,

pivot means on said fixed support,

a seat back support pivotally connected to said fixed support by said pivot means for free swinging movement from an upright position forwardly to a clearance position to afford access to the rear seat of a two-door vehicle and rearwardly through a range of rearwardly inclined positions to a reclining position,

manually operated locking means for fixing said seat back support in adjusted position throughout said range of rearwardly inclined positions, and

separately manually operable latch means for releasing said seat back support for free swinging movement between its upright position and forwardly inclined clearance position.

3,973,289

DOOR HINGE

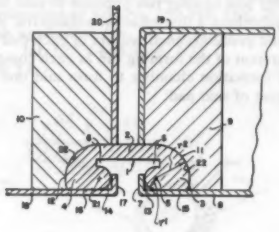
Leon B. Yulkowski, 4390 Derry Road, Bloomfield Hills, Mich. 48013

Filed May 23, 1975, Ser. No. 580,531

Claims priority, application Germany, May 31, 1974, 2426630

Int. Cl.² E05D *1/64*

U.S. Cl. 16—178 **21 Claims**



1. In combination with a door positioned adjacent and spaced from a door frame or jamb, a hinge comprising an elongated profile bracket mounted on said frame and extending over at least a part of the door height;

said bracket including a leg projecting laterally thereof;

an elongated extension on said leg having a first arcuate outer surface on one side thereof and upon its other side and spaced therefrom a second arcuate inner surface of reduced radius;

said door having along one edge a transversely arcuate bearing surface of substantially the same radius as and cooperatively receiving said first arcuate surface;

said support means on said door spaced from said transversely arcuate surface and retainingly engaging said second arcuate surface; whereby, on opening movement of the door, its arcuate bearing surface moves over and along said first arcuate surface, and said support means rotates over and along said second arcuate surface.

3,973,290

METHOD SERVING THE STUNNING OF ANIMALS FOR SLAUGHTER

Werner Schwartz, Halstenbek, Germany, assignor to Werner Wacker, Silcherweg, Germany

Filed Dec. 13, 1974, Ser. No. 532,651

Int. Cl.² A22B *3/00*

U.S. Cl. 17—45 **10 Claims**

1. Method of stunning an animal in preparation for slaughter, comprising introducing electromagnetic wave energy by irradiation to heat at least a portion of the brain of the animal, the electromagnetic wave energy penetrating the skull of the animal.

3,973,291

METHOD FOR FORMING FIBROUS PADS

Charles G. Kolbach, Media, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 237,963, March 24, 1972, Pat. No. 3,846,871, which is a continuation-in-part of Ser. No. 67,862, Aug. 28, 1970, abandoned. This application May 31, 1974, Ser. No. 475,034

Int. Cl.² D01G *25/00*

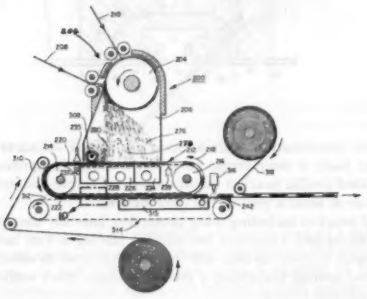
U.S. Cl. 19—148 **8 Claims**

1. A method for forming individual, spacedapart fibrous pads which have different predetermined regions having different weights of fibers per unit area therein, and for conveying the pads to a subsequent processing operation, said method comprising the steps of:

A. entraining fibers in air to form an air-suspension of fibers within a formation chamber;

B. closing one end of the formation chamber with a forming fun of an moving pad-formation assembly to provide a forming area on the forming run in underlying relationship with the formation chamber, said assembly having a plurality of spaced, three-dimensional pad-receiving compartments therein, each pad-receiving compartment being defined, in part, by a bottom air-permeable surface, said pad-formation assembly including a substantially linear pad-transfer run opposed to said forming run;

C. establishing a first effective volumetric air flow through a first predetermined section of each pad-receiving compartment of the forming run as each compartment passes the formation chamber to form said one predetermined region of said pad;



D. establishing a second effective volumetric air flow which is different than said first effective volumetric air flow through a second predetermined section of each padreceiving compartment in the forming run as each compartment passes the formation chamber to form said at least one other predetermined region of said fibrous pad;

E. directing the formed pads out of said forming area on the pad-formation assembly and to the pad-transfer run of said assembly;

F. directing a linear pad-receiving run of a padtransfer conveyor means generally parallel to the substantially linear pad-transfer run of the pad-formation assembly; and

G. establishing a partial vacuum through said padreceiving run for transferring allegiance of the formed fibrous pads from the pad-transfer run of the pad-formation assembly to the pad-receiving run of the pad-transfer conveyor means.

3,973,292

COLLAR

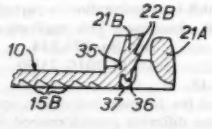
Robert Yves Gabriel Bonnet, 24 Bd Richard Lenoir, 75011 Paris, France

Filed June 13, 1974, Ser. No. 479,132

Claims priority, application France, June 19, 1973, 73.22203

Int. Cl.² B65D *63/00*

U.S. Cl. 24—16 PB **9 Claims**



1. A collar comprising a flexible strap with first and second ends, a flat integral fastening head adjacent said first end, an aperture in said fastening head through which said second end of said strap can be passed to form a closed loop, and two blocks integral with said fastening head on opposite sides of said aperture, said blocks being flexible and adapted to be displaced away from each other for enabling said strap second end to pass therethrough, said blocks projecting from the general plane of said fastening head and defining at all times a passage which is disposed beyond said aperture along the general axis thereof and in continuation thereof, at least one of said blocks having a shoulder projecting into said aperture and engageable with said fastening head for limiting flexing of said one block in a direction to close said passage.

3,973,293

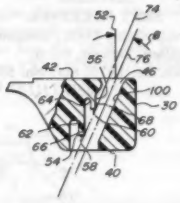
BUNDLING STRAP

Peter Noorily, Holliswood, N.Y., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Feb. 2, 1976, Ser. No. 654,564

Int. Cl.² B65D *63/00*

U.S. Cl. 24—16 PB **8 Claims**



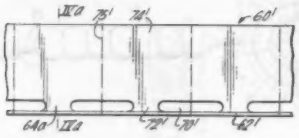
1. A tie means comprising: a generally flat flexible elongate member having an upper surface and a lower surface; a plurality of transverse teeth extending along said upper surface of said elongate member, each of said teeth having a leading surface and a trailing surface, said leading and said trailing surfaces of a respective tooth communicating with one another along a line, said trailing surface lying in a plane selectively oriented at an oblique angle to the longitudinal axis of said elongate member; an enlarged head portion at one end of said elongate member, said head portion having a front surface and a rear surface, said head portion front and rear surfaces being arranged in substantially parallel planar disposition, said head portion having an opening extending therethrough between said front and said rear surfaces, said opening being selectively axially oriented at an oblique angle to an axis perpendicular to the planes of said front and said rear surfaces for receiving said elongate member therethrough; at least two discrete, individually supported, elongate barb means depending from said head portion and extending substantially parallel with one another within said head portion opening, said barb means each having a first end, a second end, and a body portion therebetween, said barb means each extending along its respective longitudinal axis in a direction perpendicular to the planes of said front and said rear head portion surfaces, said first end of said barb means terminating in a tooth engaging surface selectively configured to interlock with a respective one of said elongate member teeth trailing surfaces upon the attempted withdrawal of said elongate member from within said head portion opening.

3,973,294

CLOSURE STRIP FOR FLEXIBLE-WALLED CONTAINERS

Walter Pfizenmaier, Industriestrasse, 7171 Schwab. Hall-Hessental, Germany

Filed Dec. 13, 1974, Ser. No. 532,529
Claims priority, application Germany, Dec. 17, 1973, 2362598; Nov. 13, 1974, 2453747
Int. Cl.² B65D 77/16
U.S. Cl. 24—30.5 T 10 Claims



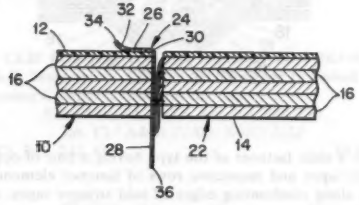
9. A closure strip comprising a plurality of closure members connected end-to-end to form a strip, said closure members adapted to retain an open end portion of a flexible-walled container in a closed condition, each of said closure members including a rigid, self-supporting web of material and a deformable elongated element supported by said web and extending in the longitudinal direction of the member; each of said elements including two ends which are both permanently deformable around a closed neck portion of the container to hold it closed, each of said webs including a rigid portion extending laterally a substantial distance to one side of said element to provide a surface for carrying information about the container contents, said closure members being connected along weakened lines, and the rigid web of each of said closure members including longitudinally-extending slots at the opposite ends of each of said closure members.

3,973,295

CUTOUT HOLDING CLIP

William R. Janke, Rte. 3, Northfield, Minn. 55057

Filed Aug. 2, 1974, Ser. No. 494,072
Int. Cl.² A44B 21/00; G12B 9/00
U.S. Cl. 24—73 B 9 Claims



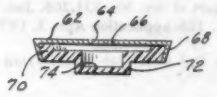
1. A cutout holding clip comprising an L-shaped member of sheet material forming generally perpendicular first and second legs, said legs being connected to each other at one end along only a straight line, a pair of laterally spaced resilient fingers integrally connected at one end to said second leg at respective laterally spaced locations toward the free end of said second leg and extending toward said one end of said second leg which is connected to said first leg, said fingers each having two points at its free end which are offset from one face or side of said second leg in a direction opposite to the direction in which said first leg extends, the points on one of said fingers being located at different distances from said one end of said second leg and the points on the other of said fingers being located at still different distances from said one end of said second leg so that all of said points are at different distances from said one end of said second leg, whereby said second leg can be inserted in the kerf made by a saw when cutting out a portion of a panel or wall so that the points on said fingers press against the edge of the portion being cut out, said first leg confronting a marginal section of the panel surrounding the cutout portion.

3,973,296

METAL BUTTON ASSEMBLY

Richard J. Peterson, Paramus, N.J., assignor to C & C Metal Products Corporation, Englewood, N.J.

Continuation of Ser. No. 389,684, Aug. 20, 1973, abandoned, which is a continuation of Ser. No. 190,958, Oct. 20, 1971, abandoned. This application Jan. 28, 1975, Ser. No. 544,821
Int. Cl.² A44B 1/18, 1/12
U.S. Cl. 24—90 TA 3 Claims



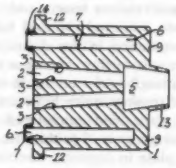
1. A button assembly including in combination a first shell formed of metal having a top portion provided with thread receiving openings and having a depending peripheral sidewall portion, a second shell formed of a semi-rigid material having a bottom and having an up-standing peripheral sidewall portion, the sidewall portions of the two shell being so constructed that the second shell may be snapped into the first shell to form a hollow button assembly, the bottom of the second shell comprising a generally flat needle-pieceable portion registering with said openings and abutting material to which the button assembly is to be sewn, the second shell having sufficient rigidity to prevent puckering of such material in the vicinity of its threaded attachment to the button assembly.

3,973,297

CABLE ANCHORING EQUIPMENT

Konstant E. Bruinette, Johannesburg, South Africa, assignor to Triple Bee & Prestress (Proprietary) Limited, Pretoria, South Africa

Filed Sept. 30, 1974, Ser. No. 510,649
Claims priority, application South Africa, Dec. 14, 1973, 73/9481
Int. Cl.² F16G 11/04
U.S. Cl. 24—122.6 5 Claims



1. A cable coupler, comprising:
a housing;
means defining at least one blind passage of generally rectangular transverse cross-section opening through only one end of the housing, and including two generally parallel opposed walls and two opposed walls which diverge as the passage proceeds towards its blind end; and
a multiple-part wedge assembly received within the passage and including on at least one said part thereof at least one concave cross-sectioned surface portion, each for securing a single cable between itself and a respective one of said two opposed walls which diverge,

the wedge assembly including means for applying a positive initial engagement force to each secured cable and for cooperating with said two opposed walls which diverge to retain the wedge assembly in the blind passage;

a plurality of further passages in the housing having their axes mutually inclined toward one another;

said plurality of further passages joining in a single outlet at the opposite end of the housing from the one through which said at least one blind passage opens; and

a lip projecting axially outwards from the housing peripherally of said single outlet, for receiving a cable sheath.

3,973,298

TIE DOWN BRACKETS FOR FLEXIBLE MEMBERS

Willard W. Moser, Box 1503, Guymon, Okla. 73942

Continuation-in-part of Ser. No. 431,205, Jan. 7, 1974, Pat. No. 3,889,321. This application Apr. 3, 1975, Ser. No. 564,806

Int. Cl.² A43C *3/0;* **B21D** *53/46*

U.S. Cl. 24—146 **5 Claims**

1. A tie down bracket for engaging a bight in a flexible member comprising:

a base plate;

a spring supporting body secured to said base plate and having

a dished-out central portion;

an arcuate surface curving upwardly from one end of said spring supporting body toward said dished-out central portion, and curving away from said base plate toward said central portion of said spring supporting body; and

a retainer finger projecting from said dished-out central portion on the opposite side thereof from said arcuate surface whereby said dished-out central portion of said spring supporting body is located between the arcuate surface and said retainer finger, said retainer finger being spaced from, and defining, a retainer space with said base plate, and having an opening therethrough communicating with said retainer space; and

a spring plate mounted on said body and having a first portion positioned in the dished-out central portion of said body, and further having a convoluted portion extending through said opening in said retainer finger and across said retainer space between the retainer finger and said base plate, said convoluted portion of said spring plate forming a pair of guide surfaces inclined away from said base plate in opposite directions, one guide surface facing the interior of said retainer space and the other guide surface facing exteriorly thereof.

3,973,299

FASTENER AND METHOD OF USING SAME

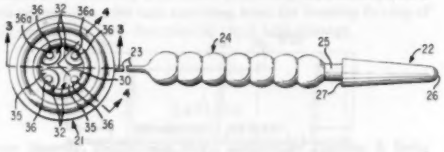
Jack D. Keefe, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Mar. 20, 1975, Ser. No. 560,433

Int. Cl.² B65D *63/16, 55/06*

U.S. Cl. 24—150 FP **22 Claims**

1. A one-piece fastener composed of flexible, molded, polymeric, plastics material, the fastener comprising a socket, a head and a flexible filament connected at its one end to the socket and at its other end to the head, the socket including a generally disc-shaped body, an opening extending generally transversely through the body, the opening having a side wall, a plurality of projections joined at their respective bases to the body adjacent the side wall and extending into the transverse opening, and transversely extending posts joined to respective projections, each post extending into the space defined by the side wall in a location adjacent the side wall, at least the bases



of the projections being sufficiently small in section to enable the projections to flex as the head is inserted through the opening to effect coupling of the head with the socket, the sides of the respective posts being urged into contact with the side wall upon attempted withdrawal of the head through the opening thereby preventing uncoupling of the head from the socket.

3,973,300

FASTENER SLIDER

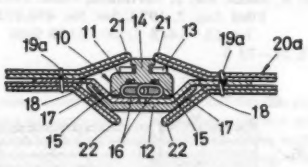
Ikuo Takamatsu, Uozu, Japan, and Yoshida Kogyo Kabushiki Kaisha, 03, Japan

Filed Feb. 4, 1975, Ser. No. 546,878

Claims priority, application Japan, Feb. 8, 1974, 49-16539[U]

Int. Cl.² A44B *19/26*

U.S. Cl. 24—205.15 R **2 Claims**

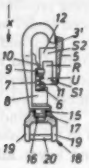


1. In a slide fastener of the type having a pair of opposed stringer tapes and respective rows of fastener elements disposed along confronting edges of said stringer tapes, and a slider moveable along said rows of fastener elements to selectively open and close the slide fastener, said slider having a top wing, a bottom wing and means connecting said top and bottom wings to define a generally Y-shaped guide channel through said slider accommodating the passage of said rows of fastener elements, the improvement which comprises one of said wings having opposing lateral extensions defining guide members each directed at an inclination with respect to the other wing and engaging a corresponding stringer tape to hold said stringer tape in an offset configuration whereby the edge portion of the stringer tape remote from the row of fastener elements thereof is in a plane displaced from the row of fastener elements to prevent intrusion into the guide channel of other material attached to the stringer tape, the bottom wing having said guide members and including on said slider a pair of side flanges downwardly directed and formed along respective marginal edges of said top wing, and the bottom edges of said side flanges being disposed below the top edges of said guide members.

3,973,301
SPRING HOOK

Hermann Buhr, deceased, late of Velbert, Germany, by Marlies Buhr, heir, assignor to Firma Gebr. Batz, Heiligenhaus, Rhineland, Germany

Filed Mar. 5, 1975, Ser. No. 555,690
Int. Cl.[2] A44B 13/02
U.S. Cl. 24—239 8 Claims



1. A spring hook, comprising

a hook shank defining a longitudinal direction and having a hook mouth,

a form part mounted on said shank longitudinally moveable relative thereto and having wings laterally extending at both sides of said shank, respectively,

slide means for closing said hook mouth, said slide means including hook-like projections adjacent both sides, respectively, of said shank, said projections extending toward said form part and hook-like engaging behind said wings, respectively, of the form part for locking said slide means into operative joint moveable position therewith, said slide means longitudinally moveable with said form part relative to said shank,

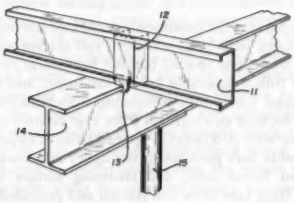
biasing means constituting a separate spring for biasing said form part, and thereby said slide means, in a direction toward closing said hook mouth by said slide means.

said slide means including said projections in cooperation with 'd form part including said wings constituting a plug a catch connection of said slide means with respect to said hook shank.

3,973,302
CLIP FOR ATTACHING HEADER TO I-BEAM

Ralph P. Semmerling, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed May 23, 1975, Ser. No. 580,259
Int. Cl.[2] A44B 21/00; E04B 5/52
U.S. Cl. 24—243 AB 10 Claims

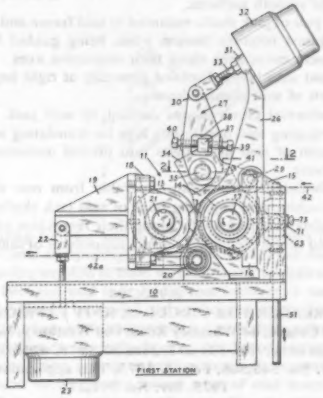


1. A clip for insertion into a C-shaped header for use in stiffening the header and interengaging said header with a flange of an I-beam or the like supporting said header, said clip comprising a C-shaped channel having a back portion and two projecting side portions, said back portion having integrally depending from one end thereof means for engaging said I-beam.

3,973,303
COMPACTOR SHOE ADJUSTMENT FOR COMPRESSIVE SHRINKING MACHINES

Edmund A. Diggle, Jr., Ho-Ho-Kus, N.J., assignor to Compax Corporation, Woodside, N.Y.

Filed July 30, 1975, Ser. No. 600,307
Int. Cl.[2] D06C 21/00
U.S. Cl. 26—18.6 9 Claims



1. In a two-roll compactor apparatus for compressively shrinking web materials and of the type comprising a machine frame, opposed feeding and retarding rollers mounted in said frame and forming a compacting nip, a compacting shoe cooperating with said rollers and said nip and having a blade-like tip spaced slightly from said nip and forming therewith a compacting zone, and means for adjusting the position of the shoe tip about the axis of said feeding roll, the improvement which comprises

a. a pair of primary shoe mounting levers positioned one at each end of the feed roller and supported for limited rotational movement about the axis of the feed roller,

b. said compacting shoe extending between and being mounted at its ends by said primary shoe mounting levers,

c. said primary levers being normally independently movable about said axis,

d. each of said primary levers having a positioning lug extending therefrom,

e. a pair of jack shafts mounted in said frame one at each side, and guided for limited movement along linear axes extending generally tangentially with respect to the positioning lugs of the respective primary levers,

f. connecting means carried by each of said jack shafts and engaging the respective positioning lugs, whereby movement of said jack shafts along their respective linear axes effects controlled rotational movement of said primary levers,

g. a pair of threaded worm wheels rotatably supported by said machine frame and threadably engaging said jack shafts for effecting controlled axial movement thereof,

h. drive shaft means connecting said worm wheels for effecting simultaneous rotation thereof.

i. said drive shaft means including an adjustable, normally fixed coupling means for controlling the rotational orientation of one of said worm wheels relative to the other.

6. In a two-roll compactor apparatus for compressively shrinking web materials and of the type comprising a machine frame, opposed feeding and retarding rollers mounted in said frame and forming a compacting nip, a compacting shoe cooperating with said rollers and said nip and having a blade-like tip spaced slightly from said nip and forming therewith a compacting zone, and means for adjusting the position of the

shoe tip about the axis of said feeding roll, the improvement which comprises

a. a pair of primary shoe mounting levers positioned one at each end of the compactor shoe and supported for limited pivotal movement about a predetermined axis,

b. said primary levers being normally independently moveable about said axis,

c. each of said primary levers having a positioning lug extending generally radially of said axis and having opposed flat smooth surfaces,

d. a pair of jack shafts mounted in said frame and restrained against rotation therein while being guided for limited linear movement along their respective axes,

e. said axes being disposed generally at right angles to the axis of said primary levers,

f. universal clevis means carried by said jack shafts and engaging said positioning lugs for translating axial movement of said jack shafts into pivotal movement of said levers,

g. threaded drive means operable from one side of the machine and engaging both of said jack shafts for translating said jack shafts along their respective axes equally and simultaneously, to effect adjustment of said shoe tip.

3,973,304

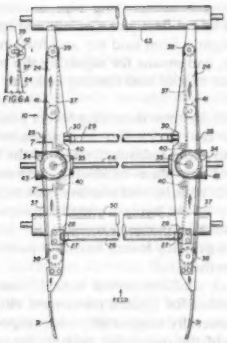
SPREADER FOR CIRCULAR KNIT FABRIC TUBES

Frank Catallo, 84 Wheatley Road, Old Westbury, N.Y. 11568

Division of Ser. No. 591,272, June 30, 1975, which is a division of Ser. No. 546,506, Feb. 3, 1975. This application June 30, 1975, Ser. No. 591,271

Int. Cl.² D06C *5/00*

U.S. Cl. 26—84 **6 Claims**



1. In a spreader for an advancing circular knit fabric tube; a frame comprising a pair of spaced generally parallel frame members having spaced parallel outer edge portions; a horizontal guide attached to and extending forwardly from said frame for initiating the spreading of said fabric tube; each of said frame members being provided intermediate its ends with a pair of vertically spaced upper and lower idler wheels freely rotatable about vertical axes and of symmetrically opposed frusto-conical configuration and having portions of their peripheries extending laterally beyond the outer edge of their associated frame member; two sets of oppositely driven, symmetrically opposed, upper and lower tapered drive rolls disposed in opposition to the frusto-conical faces of said vertically spaced upper and lower idler wheels to define fabric advancing nips therebetween; a pair of oppositely extending, transverse, freely rotatable, upper and lower circumferential drive rolls mounted across said frame members adjacent the front ends thereof; a pair of oppositely driven, spaced parallel, transverse, upper and lower control rolls operably mounted in nip-defining relation with the respective said upper and lower circumferential drive rolls; variable speed means for driving said sets of tapered rolls; and variable speed means for driving said control rolls, the said variable speed means for driving said control rolls additionally including means for selectively controlling the effective operational speed of each of said control rolls.

6. In a spreader for an advancing circular knit fabric tube; a frame comprising a pair of spaced generally parallel frame members having spaced parallel outer edge portions, each of said frame members being provided intermediate its ends with a pair of vertically spaced upper and lower idler wheels freely rotatable about vertical axes and of symmetrically opposed frusto-conical configuration and having portions of their peripheries extending laterally beyond the outer edge of their associated frame member; two sets of oppositely driven, symetrically opposed, upper and lower tapered drive rolls disposed in opposition to the frusto-conical faces of said vertically spaced upper and lower idler wheels to define fabric advancing nips therebetween; a pair of oppositely extending, transverse, freely rotatable, upper and lower circumferential drive rolls mounted across said frame members adjacent the front ends thereof; a pair of oppositely driven, spaced parallel, transverse, upper and lower control rolls operably mounted in nip-defining relation with the respective said upper and lower circumferential drive rolls; variable speed means for driving said sets of tapered rolls; and variable speed means for driving said control rolls, the said variable speed means for driving said control rolls additionally including means for selectively controlling the effective operational speed of each of said control rolls.

3,973,305

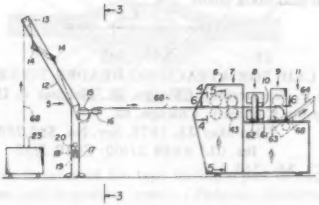
APPARATUS FOR CONDITIONING AND CALENDERING CIRCULAR KNIT TUBULAR FABRICS

Frank Catallo, 84 Wheatley Road, Old Westbury, N.Y. 11568

Filed Feb. 3, 1975, Ser. No. 546,506

Int. Cl.² D06C *5/00*

U.S. Cl. 26—81 **10 Claims**



1. Apparatus for conditioning and calendering circular knit fabric tubes including; a control roll station provided with a pair of transverse spaced parallel horizontal upper and lower control rolls engageable across the upper and lower faces of a flattened fabric tube advancing therebetween; a drive roll station located downstream from said control roll station and provided with two laterally spaced pairs of opposed drive rolls engageable with portions of the upper and lower faces of said flattened fabric tube; and steaming station located downstream from said drive roll station and provided with a pair of opposed transverse hoods for applying steam to said fabric tube; a calender station located downstream from said steaming station and provided with a pair of opposed transverse calender rolls; a horizontal spreader for spreading said flattened fabric tube to a predetermined width during its advance through said apparatus, said spreader being interposed between said control rolls, said drive rolls and said steam hoods and being provided with a frame extending from said control roll station into proximity to said calender station, said

spreader being provided at its forward end with a pair of freely rotatable oppositely disposed transverse circumferential drive rolls located in nip-defining relation to front portions of said control rolls whereby to provide a circumferential feed control for the upper and lower layers of said spread fabric tube and to support the front end of said spreader frame intermediate said control rolls, the engagement of said circumferential drive rolls against said control rolls being effective to restrain said spreader against movement in the direction of advance of said fabric tube, the mid portion of said spreader frame being supported by engagement between said pairs of drive rolls and the rear portion of said spreader frame being extended cantileverly into proximity to said calender station; means for driving said control rolls in opposite directions and operable to effect selective control over the advance and relative alignment of the upper and lower layers of the fabric tube; means for driving said pairs of drive rolls in opposite directions; means for supplying steam to said steam hoods; and means for driving said calender rolls in opposite directions.

3,973,306

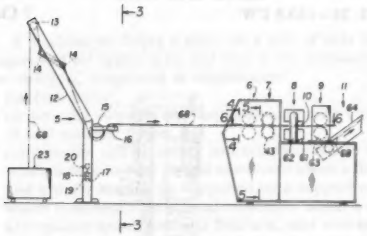
METHOD OF ORIENTING AND CALENDERING CIRCULAR KNIT FABRIC TUBES

Frank Catallo, 84 Wheatley Road, Old Westbury, N.Y. 11568

Division of Ser. No. 546,506, Feb. 3, 1975, abandoned. This application June 30, 1975, Ser. No. 591,272

Int. Cl.² D06C 5/00

U.S. Cl. 26—81 **4 Claims**



1. In a method of spreading, orienting and conditioning a tube of circular knit fabric, the steps of laterally stretching a continuous tube of circular knit fabric over a spreader having a front end and a rear end thus shaping said fabric tube into a flattened condition having upper and lower layers, circumferentially feeding the said upper and lower layers of said flattened fabric tube along the spreader at a location adjacent the front end thereof, feeding the said upper and lower layers of said flattened fabric tube at a location intermediate the ends of said spreader and at a selectively variable predetermined speed, the speed of said front end circumferential feeding of said upper and lower layers initially being substantially the same as that of said predetermined speed at said intermediate location, internally feeding the edges of said flattened fabric tube along the spreader from a location adjacent the front end thereof to a location rearwardly of that where said intermediate feeding of said upper and lower layers occurs, selectively varying the speed of said front end circumferential feeding of said upper and lower layers relative to each other and to the speed of feeding thereof at said intermediate location to effect selective control over the advance and relative alignment of the upper and lower layers of the fabric tube, and delivering said fabric tube to a further processing unit.

3,973,307

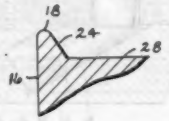
CUTTING INSERT

James F. McCreery, Latrobe, and Dennis G. Jones, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Continuation-in-part of Ser. No. 528,211, Nov. 29, 1974, which is a continuation-in-part of Ser. No. 339,415, March 8, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,808

Int. Cl.² B26D 1/00

U.S. Cl. 29—95 R **4 Claims**



1. A cutting tool for use in removing metal chips from a workpiece and comprising: a body of hard wear resistant material having top and bottom surfaces and a peripheral wall extending between said top and bottom surfaces; a radiused cutting edge formed on one of said surfaces along the juncture of said one surface with said peripheral wall; descending wall means extending downwardly from said radiused cutting edge and a planar floor means extending inwardly towards the center of said tool from the lowest edge of said descending wall, the distance from the top of said radiused cutting edge to said planar floor being less than the distance from said peripheral wall to the juncture of said descending wall means with said planar floor.

3,973,308

CUTTING TOOL

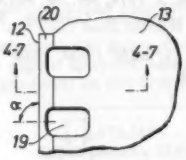
Evert Gustav Lundgren, Sandviken, Sweden, assignor to Sandvik Aktiebolag, Sandviken, Sweden

Filed Apr. 8, 1975, Ser. No. 566,054

Claims priority, application Sweden, Apr. 24, 1974, 7405478

Int. Cl.² B26D 1/00

U.S. Cl. 29—95 R **4 Claims**

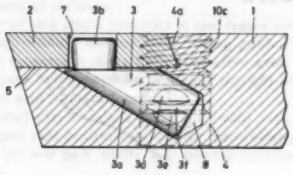


1. In a cutting tool for chipforming machining of metal work-pieces, said tool (10) having at least one corner with at least one connected cutting edge (12) formed by the transition between side surfaces (13) and an end surface (14) of the cutting tool, said side surfaces being chip faces or contact surfaces (18) between the cutting tool (10) and the formed chip (17) in the cutting operation, said end surfaces (14) being clearance faces, the improved formation wherein the chip face (13) or the contact surface (18) has several depressions (19) or notches separated from each other and situated inside and spaced from the cutting edge (12), said depressions, when in contact with the chip, failing to break, plastically deform or otherwise work or form the chip.

3,973,309
CLAMPING TOOL HOLDER FOR REVERSIBLE CUTTING ELEMENT

Pierre Kummer, Rue des Pres 20, 2720 Tramelan, Bern, Switzerland

Filed July 2, 1975, Ser. No. 592,379
Int. Cl.² B26D *1/00*
U.S. Cl. 29—96 3 Claims

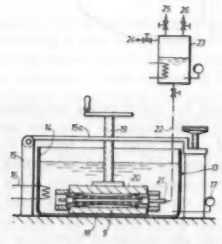


1. A clamping tool holder for a plate-shaped, apertured reversible cutting element, comprising a shank with a support surface for the cutting element and a bore opening into the support surface at an acute angle, a clamping stud having a clamping head which is engageable in the aperture of the cutting element and having a shaft which has an axially slidable fit in said bore, and further comprising a control screw which is adjustably mounted in the shank in a position offset laterally of the shank from the shaft of the clamping stud, in operative engagement with the said shaft, wherein the improvement comprises an annular groove on the surface of the control screw, and a single tooth, extending at right angles to a plane passing through the axis of the control screw and at an acute angle to planes passing through the axis of the shaft of the clamping stud, which is engaged in said groove and is formed in the shaft of the clamping stud by two milled shoulders, said control screw having smooth-walled-cylindrical peripheral surface portions on both sides of said groove which are in engagement with said shoulders, thereby preventing appreciable twisting of the shaft of the clamping stud by bracing said shaft against said cylindrical peripheral portions.

3,973,310
METHOD OF AND AN APPARATUS FOR FILLING MEMBRANE CASSETTES

Hans Frenken; Georg Schindler, both of Leverkusen, and Horst Kramer, Steinenbrueck, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 3, 1974, Ser. No. 502,817
Claims priority, application Germany, Sept. 9, 1973, 2345258
Int. Cl.² B23P *15/00, 19/00*
U.S. Cl. 29—156.4 R 4 Claims



1. A method of filling and adjusting a double-membrane cassette capable of acting as a link between an oil-filled piston chamber and a metering compartment of a piston metering pump, comprising the steps of:

a. coating the sealing surfaces of the membranes opposite a membrane support with a resilient cement which deforms when the membranes are pressed on and evens out any irregularities,

b. introducing as yet unclosed membrane cassette into a thermostat where its lower membrane rests on a plane-parallel plate on the bottom of the container, while an adjustable, uniform pressure is applied to the upper, opposite membrane by means of a second plane-parallel plate,

c. filling the membrane cassette in the thermostat from a container with a working liquid under an excess pressure of from 0.2 to 1 atms, and closing the cassette after filling except for a small supplemental filling connection,

d. removing the cassette connected to the said container from the thermostat, introducing it into an evacuation unit, in which plane-parallel plates with bores bear against the membrane surfaces from both sides and applying vacuum to the bores to draw the membranes against the plates and align them exactly plane-parallel whereby a small supplemental amount of working liquid flows through the small supplemental filling connection, removing the small supplemental filling connection and closing the cassette.

3,973,311
METHOD OF FORMING HIGH LOAD SELF-CLEANING HELICAL SPRING FILTERS

Bobby G. Harnsberger, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 483,504, June 27, 1974, Pat. No. 3,937,281. This application July 21, 1975, Ser. No. 597,863
Int. Cl.² B23P *15/16*
U.S. Cl. 29—163.5 CW 7 Claims

1. A method for forming a self-cleaning helical spring filter for mounting on the lower end of a tubing string extending down into a well to a liquid-containing sand strata comprises the steps of,

a. forming holes in the grooves of a hollow helically grooved mandrel,

b. forming spacers on one side of the convolutions of a helical spring for leaving a precise spacing between the convolutions when the spring is compressed,

c. mounting the helical spring over the hollow helically grooved mandrel with the helical spring convolutions in opposite pitch to the mandrel helical grooves,

d. fixedly attaching one end of the helical spring to an adjacent end of the mandrel, and

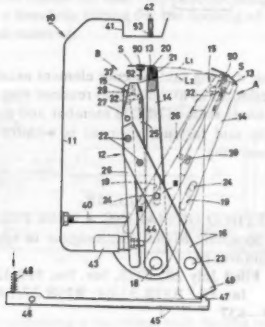
e. extending the other end of the helical spring to spread the spring convolutions for backwashing spring cleaning liquid through the hollow mandrel, the mandrel holes, the mandrel grooves, and the spring convolutions for efficient and increased flow of the spring cleaning liquid.

3,973,312

SLIDER FITTING AND END STOP APPLYING MACHINE

Hisashi Douri, Kurobe, and Tatsuo Oosaki, Uozu, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed July 11, 1975, Ser. No. 595,233
Claims priority, application Japan, July 18, 1974, 49-82897
Int. Cl.² B23P *19/04*
U.S. Cl. 29—207.5 SL 5 Claims



1. A machine for fitting a slider on a pair of slide fastener stringers and for applying an end stop to the interlocked fastener stringers, comprising in combination:

a machine frame;

a reciprocally movable end stop applying punch contained in said machine frame; and

a combination unit including an anvil mounted on an arm which is mounted for pivotal movement about a first axis, and a slider holding jig supported by a support member which is mounted for pivotal movement about a second axis spaced apart from said first axis, said arm and said support member being operatively interlocked in crossing relation to each other, the arrangement being such that said anvil and said jig are automatically moved up and down with respect to each other while said combination unit is pivoted between a slider fitting station and an end stop applying station where said end stop applying punch registers with said anvil.

3,973,313

APPARATUS FOR ASSEMBLING MICRO-FILTER UNITS

H. Eric Hunter, Westwood, Calif., assignor to Carter-Wallace, Inc., New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,663
Int. Cl.² B23P *19/04*
U.S. Cl. 29—208 C 7 Claims

1. An apparatus for assembling micro-filter units having a barrel, a plug adapted for insertion into said barrel, and a filter disc clamped between the barrel and the plug, the combination which comprises

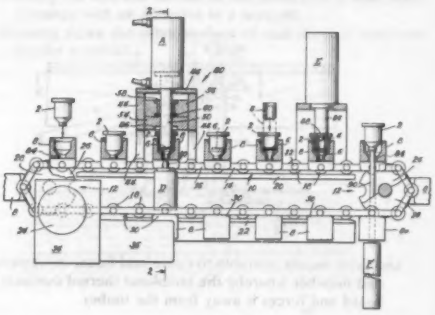
a plurality of spaced stations,

a plurality of barrel holders having the same spacing as the stations,

indexing means adapted intermittently to advance the barrel holders from station to station,

punch and die means located at one of said stations in apposition to the open end of the barrel which is in the barrel holder positioned at that station and with the axis of the punch coinciding with the axis of the barrel,

said punch having a reach such that, after a disc is punched out, a continuation of the punching stroke carries the disc into the barrel, and



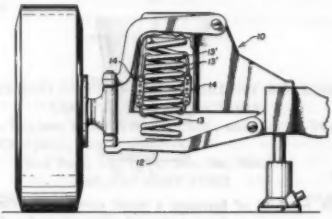
means at a subsequent station for seating a plug in the barrel in contact with the filter disc.

3,973,314

SPRING COMPRESSION TOOL

William E. Shultz, 239 N. Main St., Lombard, Ill. 60148

Filed Aug. 21, 1975, Ser. No. 606,666
Int. Cl.² B23P *19/04*
U.S. Cl. 29—227 5 Claims



1. A spring compression tool comprising at least a pair of compression members adaptable for engagement with spaced convolutions of a coil spring, each of said compression members comprising an elongated central body portion having a pair of opposed side walls connected by a transverse cross member, the side walls having a plurality of aligned apertures; and an upper and lower hook member pivotally attached to said central body portion by means of pins extending through a pair of said aligned apertures, said hook members being adjustable longitudinally on said body portion.

3,973,315

DEMOLITION TOOL

Arthur E. Thanghe, 629-6th St. SE., Minneapolis, Minn. 55414

Filed June 6, 1975, Ser. No. 584,691
Int. Cl.² B23P *19/04*
U.S. Cl. 29—239 11 Claims

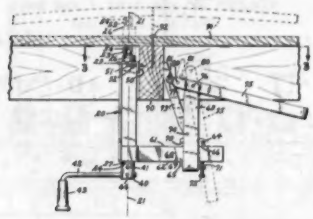
1. A demolition tool for separating boards from timbers to which they are nailed comprising, in combination:

an elongated frame having a longitudinal axis, a face parallel to said axis, and a guideway extending along said axis between first and second ends of the frame;

a member mounted for linear movement in said guideway along said axis, and having an outer end extending beyond said first end of said frame;

means acting transversely to said axis for removably clamping said face of said frame against a timber so that said axis is perpendicular to a board to be removed, and said

outer end of said member extends toward the boards to be separated;



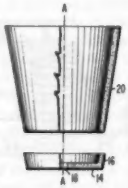
and drive means operable to cause said linear movement of said member whereby the outer end thereof contacts the board and forces it away from the timber.

3,973,316

METHOD OF MAKING PLANT CONTAINER

William Joseph Maher, 472 Ludlow Ave., Cranford, N.J. 07016

Filed Mar. 17, 1975, Ser. No. 559,173
Int. Cl.² B23P 17/00
U.S. Cl. 29—416 3 Claims



1. A method of forming a plant container from a plastic foam cup having a funnel-shaped sidewall and a disk-shaped bottom closing a small end of said sidewall comprising,

severing a first portion of said cup, including said bottom and a part of said sidewall, from a second portion of said cup, including the remaining part of said sidewall, along a plane perpendicular to a central axis passing through said cup, and,

inserting and wedging said first portion into said second portion.

3,973,317

ARRANGEMENT FOR REMOVAL OF CAPTIVE FASTENER

Bulent Gulistan, Malibu, Calif., assignor to Deutsch Fastener Corporation, Los Angeles, Calif.

Division of Ser. No. 540,583, Jan. 13, 1975, Pat. No. 3,947,945. This application Aug. 21, 1975, Ser. No. 606,570
Int. Cl.² B23P 19/02
U.S. Cl. 29—427 8 Claims

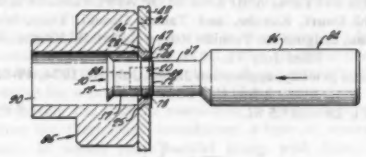
1. The method of removing a fastener element from a substantially axially fixed resilient retainer ring in which the fastener element has first and second spaced exterior surface portions,

a third exterior surface portion tapering from adjacent said first surface portion to a location adjacent said second surface portion, and a shoulder between said second and third surface portions,

said retainer ring being engageable with said first and third surface portions and with said shoulder for precluding movement of said fastener element in one direction relative to said retainer ring, comprising the steps of

positioning said fastener element axially so as to cause said retainer ring to engage said first surface portion and to be remote from said third surface portion,

placing a member around said fastener element at said third surface portion adjacent said shoulder so that said member presents an outer surface substantially of the diameter of said shoulder,



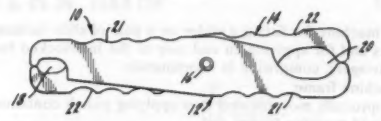
and then moving said fastener element axially in said one direction so as to cause said retainer ring to slide along said outer surface of said member and past said shoulder as said fastener element is withdrawn from said retainer ring.

3,973,318

METHOD OF MAKING A FUSE PULLER

Ronald A. Strachan, Malta, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Filed July 28, 1975, Ser. No. 599,328
Int. Cl.² B32B 31/04; B25B 27/14
U.S. Cl. 29—437 11 Claims



1. A method of making a gripper-type fuse puller which has two crossed scissor-type arm members interconnected and turnable about a pivot with fuse-gripping jaws on the inside of such arm members at least at one end thereof, each arm member having a plurality of generally parallel arms with at least one spacer at each end interconnecting the arms of each member, including the steps of forming the spacers and arms of both members integrally at least at one end thereof so at least one of the arm members will have the arms at the other end free to be flexed apart at an open end, passing the open end of the said one arm member between the arms of the other arm member, and thereafter adhering the arms and spacers together at each of the open ends and forming a pivot in the middle of the arm members.

3,973,319

COMBINED SKIN OR ROUGH TURNING AND SMOOTHING ROLLER TOOL

Ernst Klose, Achim, Uesen, Germany, assignor to Firma Gebr. Heller, Uphusen, Germany

Filed Sept. 12, 1974, Ser. No. 505,272
Claims priority, application Germany, Sept. 17, 1973, 2346729
Int. Cl.² B26D 1/00; B24B 39/00
U.S. Cl. 29—567 3 Claims

1. A combined rough turning and smoothing roller tool, comprising a body including a front end, a back end and an outer surface having a diametrical slit extending therethrough near said front end adapted to receive a rough turning tool diametrically movably positioned therein,

a plurality of rollers for rolling smooth a bore which has been rough turned by said rough turning tool, said body

having an axially adjustable basket for said rollers axially spaced from said slit and extending between said slit and said back end,

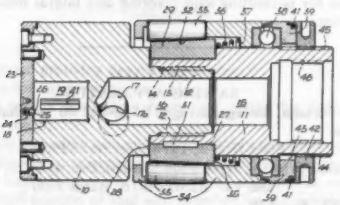
said body having a truncated cone support surface for said rollers tapering toward said front end,

said body being formed with a pocket-like feed canal for a cooling lubricant material, said feed canal being open to said back end,

discharge opening means disposed in said outer surface of said body in a space defined between said slit for said rough turning tool and said basket for said rollers,

exit bore means connecting said feed canal with said discharge openings for discharging the cooling lubricant material from said canal to said outer surface of said body,

screw thread means on said back end of said body for attaching a borehole tubing for the feeding of said coolant lubricant material,



said body comprising a receiving body having two ends, one end of which forms said front end and in which said exit bore means and said slit are formed, and a receiving sleeve having two ends, one end of which forms said back end and in which said screw thread means for the borehole tubing is formed,

said receiving body including an outer thread at the other of said two ends,

the other end of said receiving sleeve including an inner thread mounted on said outer thread of said receiving body,

said truncated cone support surface for said rollers comprising a ring disposed in an annular recess formed in said body,

said receiving sleeve having a hollow space formed therein, and wherein said receiving body is formed with said discharge openings, with said exit bore means and with a pocket bore complementing said hollow space of said receiving sleeve and forming therewith said feeding canal.

3,973,320

METHOD FOR THE PRODUCTION OF SEMICONDUCTOR DEVICES WITH AN INTEGRAL HEATSINK AND OF RELATED SEMICONDUCTOR EQUIPMENT

Giovanni Greco, Via Monte 41, 00141 Rome, and Maurizio Tomassini, Via Cassia 1020, 00191 Rome, both of Italy

Filed Sept. 3, 1974, Ser. No. 502,307

Claims priority, application Italy, Sept. 6, 1973, 52366/73

Int. Cl.² H01L *21/288*

U.S. Cl. 29—578 **15 Claims**

1. A process for the production of a semiconductor device with an integral heatsink, starting with a sheet of semiconductor material having a P / N junction, comprising the steps of

uniformly coating both surfaces of the sheet of semiconductor material with a layer of dielectric,

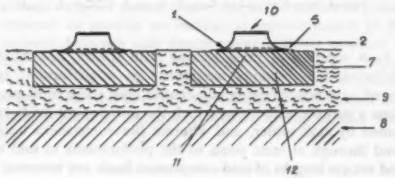
removing by photoetching from a finite number of zones the layer of dielectric from one surface of said sheet to form a finite number of locations for the sinks,

coating the finite number of zones with a first flexible metal layer,

depositing a metal layer over said first flexible metal layer at the approximate areas of said zones to establish the sink formation,

bonding the said one surface of said sheet and its associated coatings with an adhesive to a support,

thinning down the other surface of said sheet of semiconductor material,



depositing a second flexible metal layer over said other surface of said sheet,

and removing semiconductor material from the body of said sheet in the intersticial spaces between and among the said zones to produce the separation of the semiconductor units with Mesa profiles which are equipped with sinks.

3,973,321

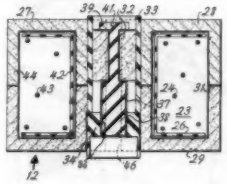
METHOD OF PREPARING CIRCUIT BOARDS COMPRISING INDUCTORS

Steven A. Horton, Los Alamitos, Calif., assignor to The Anaconda Company, New York, N.Y.

Filed Sept. 10, 1974, Ser. No. 504,773

Int. Cl.² H01F *41/02*

U.S. Cl. 29—602 R **17 Claims**



1. The method of preparing a printed circuit board having fastened thereto a member including an induction coil having a ferrite core and a slug for adjusting the position of said ferrite core with respect to said induction coil, said method comprising the steps of:

A. applying a conformal coating to said printed circuit board including said member;

B. prior to said application of said conformal coating, coating the surfaces of said member with fine particles of a fluorocarbon polymer which prevents adherence of said conformal coating to said surfaces of said member so that said ferrite core is adapted freely for movement; and,

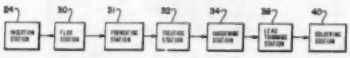
C. moving said ferrite core to change the impedance of said induction coil after the application of said conformal coating.

3,973,322

MASS SOLDERING SYSTEM AND METHOD

Kenneth G. Boynton, Milford, N.H., assignor to Hollis Engineering, Inc., Nashua, N.H.

Filed May 13, 1974, Ser. No. 469,536
Int. Cl.[2] H05K 3/30
U.S. Cl. 29—626 27 Claims



1. A method of mass joining with solder, electrical and electronic components assembled in a perforated circuit board, said board having adjacent at least some of its perforations a metallic pattern to which the component leads can be joined by said solder, and wherein the component leads extend through at least some of the perforations in said board and excess lengths of said component leads are trimmed prior to soldering, said method comprising the steps in sequence of:

a. temporarily stabilizing said components in position on said board by coupling said board and said leads to one another with a meltable cement compatible with said solder and having a melting point below that of said solder;

b. trimming said leads;

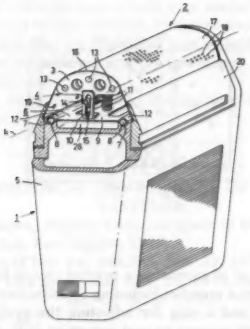
c. immersing said board and trimmed leads at least in part in a molten body of said solder so as substantially simultaneously to cause said cement to melt and said solder to replace the melted cement on said board, and to wet said metallic pattern and leads.

3,973,323

SHAVING HEAD FOR A DRY-SHAVING APPARATUS

Ferdinand Marinus Trees, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 259,598, June 5, 1972, abandoned.
This application June 19, 1974, Ser. No. 480,676
Claims priority, application Netherlands, June 12, 1971, 7108090
Int. Cl.[2] B26B 19/02
U.S. Cl. 30—43.92 3 Claims



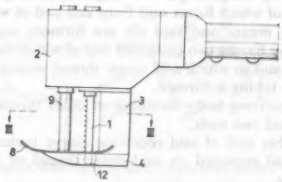
1. In a dry-shaver including a housing having a top part, and an electric motor with a drive member, the improvement in combination therewith of a shaving head comprising a cutter having a first longitudinal axis, support means carrying the cutter and mounted on the top part of said housing and reciprocally movable thereon in the longitudinal direction parallel to said first axis, said cutter being mounted on said support means about a pivot axis generally parallel to said first axis, and guide means defining a straight line and cooperating with said support means for guiding reciprocal lateral movement of the cutter toward and away from said top part when said pivot axis moves along said straight line of the guide means, said cutter comprising blades with cutting edges which are generally normal to said first axis and are aligned and define a convex curved surface extending outward from said top part, said drive member driving said cutter in said longitudinal direction, said shaving head further comprising a perforated foil shear plate wrapped about said edges and secured to said housing, and spring means being carried by said support means for urging said cutter outward with said edges against said foil, said edges each having a curved shape including a center part, said support means further comprising a support element situated inbetween said cutter and the top part of said housing, said support element being reciprocally movable by said drive member generally parallel to said first axis, said guide means also carried by said support element and including a slot extending outward from said housing, said support means further comprising axle means extending from said cutter along the pivot axis thereof and engaging said slot means for permitting said pivoting and lateral movement of the cutter.

3,973,324

SAWING APPARATUS

Curt Persson, Storegardsvagen 86, S-461 00 Trollhattan, Sweden

Filed Dec. 3, 1974, Ser. No. 529,248
Claims priority, application Sweden, Dec. 4, 1973, 7316346
Int. Cl.[2] B23D 49/16; B26B 7/00
U.S. Cl. 30—370 3 Claims



1. Sawing apparatus for cutting a plaster cast or the like having upper and lower surfaces, said apparatus comprising

a single freely reciprocating sawblade, having a forward toothed edge and a rear smooth edge,

means for operatively coupling said sawblade to a saw head,

means in said saw head for driving said sawblade in its reciprocating motion,

a flat guiding plate disposed in the same vertical plane as said sawblade and operatively connected to said saw head at one end thereof, and spaced from said sawblade rear end along the entire length thereof,

means for guiding reciprocatory motion of said sawblade and for providing a lower anvil in the direction of sawing between said plaster cast or the like and any structure over which the plaster cast or the like is disposed, and engaging the lower surface of said plaster cast or the like, said means being operatively connected to said guiding plate at an end thereof opposite said end connected to said saw head, and extending forwardly from said guiding plate past the forward toothed edge of said sawblade, and

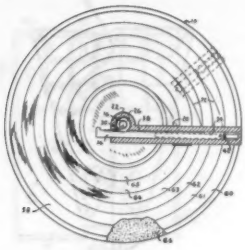
a spring-pressed gliding plate disposed generally forwardly of said sawblade for engaging the upper surface of said plaster cast or the like when said means for providing a lower anvil engages the bottom surface of said plaster cast or the like, said gliding plate having a split rear portion thereof straddling said sawblade, a portion thereof being disposed on either side of said sawblade, and wherein said means for providing an anvil and said gliding plate overlap over a substantial portion of the lengths thereof.

3,973,325

RECORD GROOVING DEVICE

James A. Vespo, 7505 Montana St., Merrillville, Ind. 46410

Filed June 4, 1975, Ser. No. 583,601
Int. Cl.² B26D 3/06; G11B 1/00; B43L 11/06
U.S. Cl. 33—27 M 2 Claims



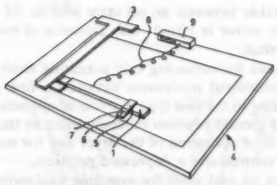
1. A record grooving device comprising:
a platen for supporting a record;
spindle means upstanding from said platen for centering said record;
a radially extending arm member rotatably mounted on said spindle, said arm member having a hub portion extending from said platen to the distal end of said spindle means, said hub portion of said arm member having a hole passageway for receiving said spindle in its entirety, said hole being annularly enlarged at the end thereof adjacent said platen, and a longitudinal channel extending the radial length of said arm member adjacent said platen opening in said annular enlarged part of said hole passageway;
a bar member longitudinally movable in said channel;
a cylindrical member in said annular part of said hole keyed to said spindle;
said cylindrical member and said bar member having means for rolling engagement therebetween;
a groove cutting means on said bar member; and
stop means adjustably positioned along the radial length of said arm member for stopping the longitudinal movement of said bar member at a preselect location.

3,973,326

DIRECT READOUT DISTANCE MEASURING DEVICE

John David Gallacher, 300 Wildwood Drive SW.; Johann Leopold Nevrkla, 2823 - 31st St. SW., and David Walter Judd, 4216 - 17th St. SW., all of Calgary, Alberta, Canada

Filed Aug. 7, 1974, Ser. No. 495,526
Claims priority, application United Kingdom, Aug. 7, 1973, 37462/73
Int. Cl.² G01B 7/18
U.S. Cl. 33—125 R 4 Claims



1. Apparatus for measuring the distance between a datum point and one or more further points comprising
an elongate member;
a cursor attached to said elongate member so as to slide along said elongate member, the position of said cursor providing an indication of the distance between the point at where said cursor is positioned and said datum point,
a resistor, having two end terminals, affixed to said elongate member and extending along the length of said elongate member, said resisor being calibrated to have an uniform resistance per unit length between the end terminals thereof,
a constant voltage supply connected to the two end terminals of said resistor,
said cursor having an electrical contact for contacting said resistor at a point so as to form a potentiometer with said resistor and said supply, the output of said potentiometer varying directly with the position of said cursor, and voltage detector means connected to the output of potentiometer to provide an indication representative of the distance between said datum point and the position of said cursor, said detector means comprising a digital voltmeter providing a digital readout, said voltmeter being connected to the output of said potentiometer and providing a high impedance relative to that of said resistor.

3,973,327

GUAGE FOR GRASS CUTTING

John Cardinale, Marlboro, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 30, 1975, Ser. No. 572,947
Int. Cl.² G01C 15/06
U.S. Cl. 33—169 R 5 Claims

1. A gauge adapted for determining the height to which grass should be cut in a lawn comprising an elongated strip having an elongated face thereon, said face having a transversely directed edge at one end serving as a reference, a plurality of sets of different indicia having different lengths on said face, each set consisting of only two longitudinally spaced apart correspondingly discrete indicia, the lengths of the indicia in each set from said reference being in a constant ratio of substantially two to three, the two indicia of said set having identical visual characteristics for indicating correspondence therebetween, and the indicia of different sets having different visual characteristics for for indicating a lack of correspondence therebetween.

3,973,328
PAPER MATERIAL DRYER

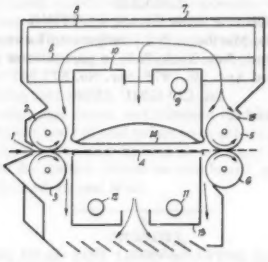
Donald David Theobald, Ilford, England, assignor to Ilford Limited, England

Continuation-in-part of Ser. No. 363,871, May 25, 1973, abandoned. This application Apr. 22, 1974, Ser. No. 463,171

Claims priority, application United Kingdom, May 26, 1972, 24946/72; Germany, May 24, 1973, 2326573; France, May 24, 1973, 73.19000; Italy, May 24, 1973, 50193/73; Switzerland, May 21, 1973, 7191/73; United Kingdom, Mar. 15, 1974, 11592/74

Int. Cl.² F26B *3/30*

U.S. Cl. 34—4 **7 Claims**



1. A method of drying polyethylene laminated base photographic paper bearing a silver or dye image in a gelatin layer on one side of the paper, so as to produce a high degree of gloss on the image side of the paper, said method comprising:

providing polyethylene laminated base photograhic paper having on one side thereof a silver or dye image in a gelatin layer;

passing said photographic paper through an enclosed drying chamber;

directing radiant heat on both sides of said photographic paper in an amount sufficient to cause any shallow indentation lines on said image side of said photographic paper to disappear; and

simultaneously causing a stream of cool air to flow over the image side of said photographic paper, thereby drying said photographic paper and producing a photographically satisfactory high degree of gloss on said image side.

3,973,329
PROCESS AND DEVICE FOR DRYING SYNTHETIC FIBROUS MATERIAL

Erich Feess, Hofheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

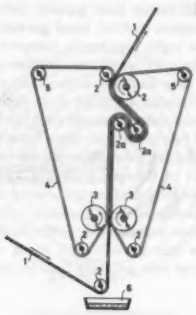
Filed Nov. 5, 1974, Ser. No. 521,205

Claims priority, application Germany, Nov. 7, 1973, 2355543

Int. Cl.² F26B *3/00*

U.S. Cl. 34—9 **19 Claims**

1. A process for drying a textile material which comprises continuously bringing a wet, predominantly hydrophobic textile material into contact with a predominantly hydrophilic absorbent material, drying the textile material, continuously squeezing off the absorbent material to remove water therefrom and regenerate its absorptivity and returning regenerated absorbent material to contact additional wet textile material.



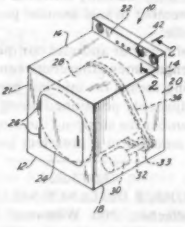
3,973,330
CONTROL DEVICE FOR STATIC DRY FEATURE

William Silva, Marion, and Richard L. Conrath, Herrin, both of Ill., assignors to Fedders Corporation, Edison, N.J.

Filed Apr. 24, 1975, Ser. No. 571,241

Int. Cl.² F26B *11/04*

U.S. Cl. 34—55 **15 Claims**



1. A control device for a dryer of the type having a drum, a drive belt surrounding said drum and drivingly connected thereto, and a motor connected to said belt for rotating said belt, said dryer being operable to perform at least a first type of cycle in which said drum is rotated and a second type of cycle in which said drum is stationary; said control device comprising:

a switch movable between an off state and an on state to connect the motor in circuit with a source of energy,

an actuating shaft,

mounting means for mounting said actuating shaft on said dryer for rotational movement between a first positoin corresponding to the first type of cycle of operation of the dryer and a second position corresponding to the second type of cycle of operation of the dryer and for movement between a normal and a depressed position,

control means on said shaft for engaging said switch when said actuating shaft is in said normal position to move said switch to the on state and for causing operation of said switch to the off state when said actuating shaft is in said depressed position,

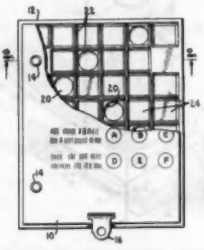
and lock means for preventing rotation of said shaft when said shaft is in said normal position and being responsive to movement of said shaft to the depressed position to permit rotation thereof.

3,973,331

MANUAL SELF-TEACHING APPARATUS

William Joseph Harte, 11 W. 53rd Terrace, Kansas City, Mo. 64112

Filed June 3, 1974, Ser. No. 475,766
Int. Cl.[2] G09B 3/08
U.S. Cl. 35—9 R 9 Claims



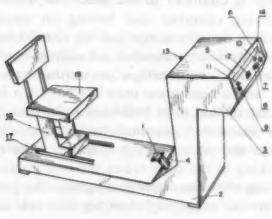
1. Educational apparatus comprising:
an instructional sheet having zones thereon for indicating answers selected in response to questions;
a plate member provided with a flat, normally upper surface having a plurality of holes extending into said member from the plane of said surface for representing answer selections of a given type;
a pattern of projections on said surface extending upwardly therefrom for receiving said sheet in overlying relationship with said projections;
means on said member for holding said sheet on said projections in a correct position where predetermined zones are aligned with said holes in accordance with the answers represented by said zones,
said projections supporting said sheet above said surface and spacing said sheet sufficiently therefrom to prevent a student from feeling said holes through said sheet; and
a stylus for punching through said predetermined zones into the holes therebeneath, whereby the stylus and the holes cooperate to provide a response feedback,
said projections being limited in height so that said stylus will penetrate said sheet only at said predetermined zones overlying said holes, and arranged to permit deflection of said sheet into contact with said surface in response to engagement by the stylus at zones on said sheet other than said predetermined zones.

3,973,332

EQUIPMENT FOR TESTING THE KINESTHETIC ABILITIES OF A PERSON'S EXTREMITIES

Waclaw Kazimierz Slomski, 426 Wilkinson St., Syracuse, N.Y. 13204

Filed Jan. 28, 1975, Ser. No. 544,202
Int. Cl.[2] G09B 19/00; G01L 5/22
U.S. Cl. 35—22 R 5 Claims



1. Apparatus for testing kinesthetic memory which comprises:
a rod including means for receiving a force exerted by the person being tested, said rod being moved by said force;
resilient means connected to said rod opposing with a progressively increasing counterforce the movement of said rod caused by said exerted force;
indicator means responsive to movement of said rod caused by said exerted force, said indicator means comprising circuit means, movement discrimination means responsive to the relative movement of said rod included in said circuit means, and indicia means interconnected into said circuit means whereby the amount of force applied to said rod in an individual test is registered by said indicia means, said indicia means comprising a series of separate characters for individually indicating the various forces which may be applied to said rod, said circuit means including clamping means for maintaining differentially relative to the other said characters in registration in said indicia means only one character of said series of characters, said one character indicating the highest force attained in each individual test; and
reset means for inactivating said clamping means for further individual tests.

3,973,333

SNOW SKI TRAINING DEVICE

Barry M. Caris, 1963 Berkeley Road, Highland Park, Ill. 60035

Filed Mar. 5, 1975, Ser. No. 555,677
Int. Cl.[2] A63B 23/00
U.S. Cl. 35—29 R 12 Claims

1. A snow ski training device comprising means to indicate to a skier that his knees have moved apart but not providing a false indication upon normal backward and forward and up and down movement of the legs, said means comprising
a first strap means for connection above the knee on one of the skier's legs,
a second strap means for connection above the knee of the other of the skier's legs, and
means for providing a releasable secure connection between said first strap means and said second strap means when the skier's legs are held together during normal skiing, said secure connection being maintained during normal backward and forward and up and down movement of the legs during normal skiing, and said means for providing a sensation only when the knees are moved apart and the connection is broken.

3,973,334

EYE-HAND PERCEPTUAL-MOTOR TRAINING DEVICE

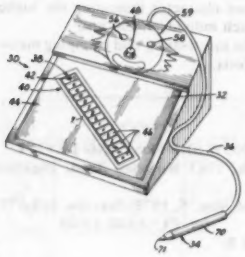
Graham M. Sterritt, 560 S. Corona, Denver, Colo. 80209

Continuation of Ser. No. 402,997, Oct. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 302,730, Nov. 1, 1972, Pat. No. 3,774,318. This application Apr. 7, 1975, Ser. No. 565,400

The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.

Int. Cl.[2] G09B *17/00*

U.S. Cl. 35—35 R 22 Claims



1. An eye-hand perceptual-motor trainer for training a student in making predetermined sequential perceptual-motor responses, said trainer comprising: a visual-kinesthetic sequence training board having a plurality of stations thereon touchable by the student and spatially arranged in a predetermined manner, sequencing means for providing successively a plurality of unique output states each corresponding to a respective one of said stations, said sequencing means operating when actuated to advance successively from state to state in a presetermined sequence, comparator means for comparing the state of said sequencing means with the station touched by the student, and in response to such comparison actuating the sequencing means upon each change in station touched and producing an evaluation signal indicating whether or not the student is touching the stations in the sequence corresponding to said predetermined sequence, and information feedback means responsive to said evaluation signal for producing a feedback signal apprising the student whether or not he is performing appropriately.

3,973,335

APPARATUS TO DEMONSTRATE AIR FLOW THROUGH PERMEABLE SHEET MATERIAL

Raymond C. Price, 756 S. Jason St., Denver, Colo. 80223

Filed July 24, 1975, Ser. No. 598,706

Int. Cl.[2] G09B *25/00*

U.S. Cl. 35—49 9 Claims

1. A permeability demonstrator comprising:

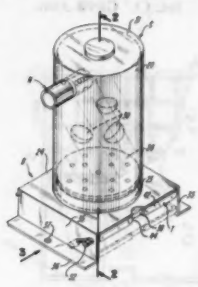
a. base means;

b. hollow vacuum housing means mounted on said base means including outlet means for drawing air from said housing means, and inlet means from said base means to said housing means;

c. perforate means in said housing for supporting air entrainable indicators;

d. means for supporting a sample of material for a permeability demonstration in said base means; and

e. seal means at said inlet means for said housing means to



provide a seal between said housing means and a held sample.

3,973,336

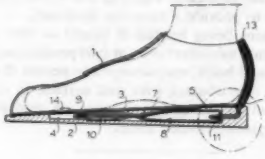
SHOES HAVING VENTS FOR VENTILATING FRESH AIR INTO THE INSIDE OF THE SHOES

Chang Kun Ahn, 283, Shinnae-dong, Dongdaemoon-Ku, Seoul, South Korea

Filed Apr. 29, 1975, Ser. No. 572,708

Int. Cl.[2] A43B *7/06*

U.S. Cl. 36—3 B 4 Claims



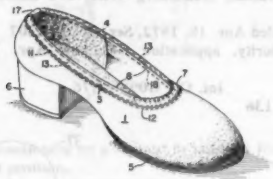
1. A shoe having ventilating means for supplying fresh air to the interior of the shoe, comprising a base sole and an inner bottom sole defining between them an air distributing chamber and a space for accommodating an air supplying chamber to the rear of the air distributing chamber, said inner sole having an aperture therein between said air from the air distributing chamber to the interior of the shoe, a collapsible resilient supplying chamber in the space for accommodating said air supplying chamber and having an air distributing conduit extending therefrom into said air distributing chamber and having an air intake conduit extending thereinto from outside of said shoe, counterflow preventing valve means in each conduit, and a rigid press member having a forward end anchored in one of said soles and having the rear end extending into said space for accommodating said air supplying chamber above the air supplying chamber, whereby when a wearer in walking in the shoe raises the rear part of the shoe, the air supplying chamber is pressed against the press member for pumping the air supplying chamber into said air distributing chamber and thence into the interior of the shoe, and when the rear part of the shoe is lowered and the air supplying chamber regains its initial shape, fresh air is induced into the air supplying chamber through the air intake conduit.

3,973,337

SHOE AND METHOD OF MAKING

W. Robert Ecton, Towson, Md., assignor to Dixon-Bartlett-Lambrecht, Inc., Baltimore, Md.

Filed Apr. 25, 1975, Ser. No. 571,564
Int. Cl.² A43B 23/00
U.S. Cl. 36—51 9 Claims



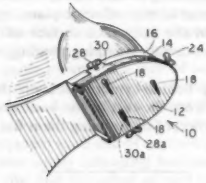
1. A shoe having a stretchable foot opening, comprising a laterally uninterrupted elastic binding bounding said opening and having a tunnel extending longitudinally therethrough, said binding in substantially ungathered and unstretched condition being attached adjacent a bottom of said tunnel in edge-overlapping relation to and projecting above an upper edge portion of an upper of the shoe, and a stretched elastic tape free floating in and extending through said tunnel and having ends secured together above said upper for gathering said binding and therethrough yieldably gripping a foot of the wearer.

3,973,338

SPIKE HEEL PLATE

Ronald Schwemmer, and William Crozier, both of Santa Maria, Calif., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 26, 1976, Ser. No. 652,202
Int. Cl.² A43C 15/00
U.S. Cl. 36—65 2 Claims



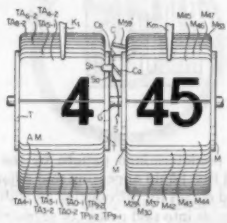
1. A spike heel plate comprising:
a bottom plate;
a rim on said bottom plate adapted to encircle the sides and rear of the heel of a boot or shoe;
a plurality of spikes protruding downward from said bottom plate;
a rear tab containing a threaded hole at the rear of said rim extending upward from the rear of said rim;
a rear thumb screw engaged in the cooperating threads of said rear tab;
two side tabs, each containing a threaded holed, at the sides of said rim extending upward from the sides of said rim;
two thumbscrews engaged in the cooperating threads of said two side tabs; and
a front lip on said bottom plate adapted to bear on the front of said heel of the boot or shoe.

3,973,339

FLAP TYPE INDICATING DEVICE

Minoru Ueda, Kouriyama, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Dec. 20, 1973, Ser. No. 426,660
Claims priority, application Japan, Dec. 25, 1972, 47-3699[U]
Int. Cl.² G09F 11/06
U.S. Cl. 40—73.4 6 Claims



3. In a flap-type indicating device including a first, rotatably indicating assembly having a plurality of flaps serially and pivotably mounted thereon about a first axis, a second rotatable indicating assembly drivingly coupled with said first indicating assembly and having a plurality of flaps serially and pivotably mounted thereon about a second axis coaxial with said first axis, and synchronizing means interposed between said first and second assemblies for synchronizing the pivotable movement of said flaps of one of said assemblies with the pivotable movement of said flaps of the other one of said assemblies, the improvement comprising:
inclined cam means associated with said one of said assemblies for axially biasing said synchronizing means in a position toward said other one of said assemblies so as to prevent one of said flaps of said other one of said assemblies from pivoting prior to a predetermined time; and,
lug means associated with one of said flaps of said one of said assemblies for engagingly retaining said synchronizing means in said biased position and continuing to maintain said biased position of said synchronizing means after said inclined cam means has been released from said synchronizing means, until said predetermined time,
whereupon said predetermined time being reached, said lug means will be released from said synchronizing means which will in turn be released from said one of said flaps of said other one of said assemblies whereby said one of said flaps of said other one of said assemblies will be able to pivot in synchronization with said one of said flaps of said one of said assemblies.

3,973,340

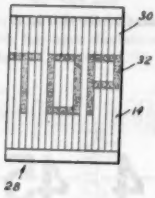
METHOD AND APPARATUS FOR CREATING VISUAL DISPLAYS

Antoine B. Khawand, 400 Madison Ave., New York, N.Y. 10017

Continuation of Ser. No. 325,899, Jan. 22, 1973, abandoned, which is a continuation of Ser. No. 71,989, Sept. 14, 1970, abandoned. This application June 10, 1974, Ser. No. 477,798
Claims priority, application Lebanon, Sept. 23, 1969, 2941/1; Switzerland, Oct. 31, 1969, 16163/69; Germany, Sept. 14, 1971, 2145889; Japan, Sept. 14, 1971, 46-71674
Int. Cl.² G09F 13/24
U.S. Cl. 40—106.21 14 Claims

1. Apparatus for creating a visual display having a discrete and predetermined pattern of information comprising a plurality of liquid conduit segments which are arrayed in a matrix with said segments side by side adjacent one another, respective sources of first and second substantially non-compressible liquids which are immiscible with each other and of varying color to thereby form said pattern and backgound for said

pattern, respectively, means for introducing said second background forming liquid into said segments, and means for introducing discrete quantities of said first pattern forming liquid into said segments at predetermined positions with respect to the second liquid to fill the segments at said positions to form



for viewing the predetermined pattern by the said discrete quantities of said first liquid appearing said adjacent segments of the matrix, and means for introducing an additional amount of one of said liquids into said matrix of segments to move the predetermined pattern formed by the quantities of first liquid as a unit through the matrix.

3,973,341

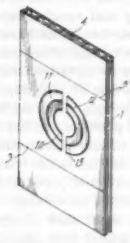
INFORMATION DISPLAY SYSTEM

Marc T. Kent, Jr., 820 Soundview Drive, Mamaroneck, N.Y. 10543

Continuation of Ser. No. 400,214, Sept. 24, 1973, abandoned. This application Oct. 14, 1975, Ser. No. 621,953

Int. Cl.² G09F 1/00

U.S. Cl. 40—124.1 **1 Claim**



1. A one piece knock-down display device adapted to be positioned as a stand-up display comprising a display section provided with a plurality of cooperatively associated information display portions; a base section connected to said display section; a line of separation disposed between said display section and said base section, enabling the formation of a stable base by bending said base section along said line; a bendable elongated support member positioned within said display device and extending substantially the entire length thereof, said support member being bendable in concert with said device; said display section being further defined by, a central fixed positioned first information display portion; a second information display portion spaced away from and surrounding said first information display portion, in a plane identical to said first information display portion; a pair of intermediary members formed as a continuation of said first and second information display portions disposed at opposite points 180° apart from one another along the principle axis of said display section, said intermediary members being adapted to fix the planar and spatial relationship of said first and second information display portions respectively; and a third information display portion in the form of individually positionable information sectors concentrically disposed about said first information display portion, each information sector being separably bendable about lines of weakening running from each of said intermediary members allowing said sector to be positioned out of the plane of said first and second information display portions, and said intermediary members.

3,973,342

LIGHT REFLECTOR PLATE AND METHOD OF FABRICATION

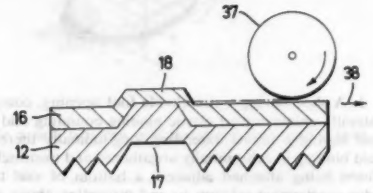
Hans-Erich Gubela, Hundeberg 41K, 7595 Sasbachwalden, Germany

Filed Apr. 18, 1972, Ser. No. 245,207

Claims priority, application Germany, Apr. 19, 1971, 2118822

Int. Cl.² G09F 13/16

U.S. Cl. 40—136 **4 Claims**



1. For manufacture of a reflector plate comprised of a light transmission synthetic plastic plate body, having a viewed front side and having integral, optically-precision-formed reflecting prisms distributed over its back side, a reflective metallic layer applied on the back side over the prisms, said reflector plate having one or more symbols delineated on its viewed front side by plate material displaced above or below the front surface of the body;

a method comprising the steps of:

preparing said body plate, with said reflecting prisms integral and evenly distributed thereon, from a light-transmissive and impact-resistant synthetic plastic;

thereafter applying a reflective metallic coating over the prisms on the back side of the body plate; and

thereafter delineating at least one symbol in a form visible from the front of the reflector plate, by offsetting the symbol from the front face surface of the plate body with conventional stamping tooling, and simultaneously

differentiating behind-symbol area on the back of the plate body from the rest of the back area by obliterating prisms thereof by pressing them flat on one of said areas.

3,973,343

PICTURE FRAME HAVING A PICTURE MOUNT

Miriam O. Tolfsen, 34-19 90th St., Jackson Heights, N.Y. 11372

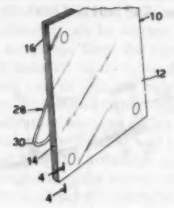
Continuation of Ser. No. 290,474, Sept. 20, 1972, abandoned. This application Apr. 21, 1975, Ser. No. 570,116

Int. Cl.² G09F 1/12

U.S. Cl. 40—152.1 **4 Claims**

1. An exhibiting device for displaying pictures, displays, etc., which comprises a frame assembly of a plurality of panels including an outer transparent panel, an intermediate mounting board panel and a rear backing board panel, said mounting board panel being of a resilient porous material, fastening means in the form of a corresponding screw bolt extending through said panels adjacent the tops thereof on each side thereof and holding said panels together to provide said frame assembly, and a U-shaped holder having a corresponding leg with a rounded end engaged around and being simultaneously

held by the screw bolt at each side under corresponding screw bolt pressure thereat and an intermediate portion extending



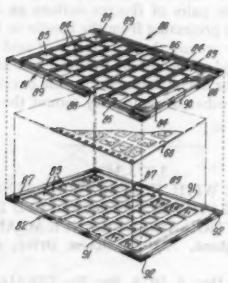
down for positioning on a support to hold the frame assembly in an erect position.

3,973,344

MULTI-IMAGE SLIDE MOUNT

Hugh Frankel, Montreal, Canada, assignor to Multi-Slide Corporation Ltd., St. Bruno, Canada

Filed Aug. 29, 1973, Ser. No. 392,559
Int. Cl.² G09F *1/10*
U.S. Cl. 40—158 B **6 Claims**



1. A multi-image slide mount comprising a plate-like body having at least two adjacent rows of opposed apertures therein; said plate-like body being adopted to receive and secure a film strip having images thereon in alignment with said apertures; guide means on a face of said body extending sequentially about said apertures for providing a guide channel, said guide means comprising a raised elongated guide rib adjacent each side of said rows of apertures and a raised transverse rib adjacent each end of said rows of apertures; said elongated ribs alternately extending transversely from one of said transverse ribs and the other of said transverse ribs and terminating in a free end at a point spaced from one or the other of said transverse ribs to provide said guide channel between said ribs and between opposed apertures at one end of said adjacent rows of apertures.

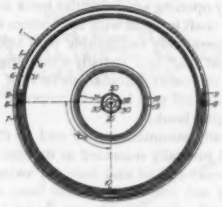
3,973,345

IDENTIFICATION APPARATUS FOR A CYLINDRICAL CONTAINER

Akinori Isobe, 5-13 Honcho 2-chome, Shibuya, Tokyo, Japan

Filed Aug. 3, 1972, Ser. No. 277,686
Claims priority, application Japan, Aug. 17, 1971, 46-62386; Dec. 31, 1971, 47-1955
The portion of the term of this patent subsequent to May 10, 1993, has been disclaimed.
Int. Cl.² G09F *23/00*
U.S. Cl. 40—309 **4 Claims**

1. An identification apparatus for a cylindrical container, said apparatus comprising a movable member rotatably mounted on a periphery of said container,, the periphery being formed in the container with an annular space, said movable member having identification portions and being semicircular and received in said annular space for rotation about the axis of said container, said movable member being adapted to be rotated by gravity of a weight with respect to the



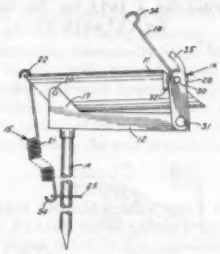
container, there being a weight mounted on said movable member and adapted to move said identification portions to lateral sides of the periphery of said container when the container is in its vertical position whereby said identification portions can be seen.

3,973,346

FISHING POLE HOLDER

Les Mason, 4028 Ridge Drive, Pueblo, Colo. 81008

Filed Nov. 7, 1974, Ser. No. 521,579
Int. Cl.² A01K *97/12*
U.S. Cl. 43—15 **1 Claim**



1. A fishing pole tender for automatically and upwardly lifting a fishing pole in response to a tug on the fishing line on said pole comprising in combination:

a longitudinal cylindrical tube having a socket formed therein at the foward end thereof for slideably receiving the handle of said fishing pole, said tube having opposing ends cut in rearwardly and upwardly sloping parallel angles so that the first end nearest said fishing pole defines a bottom forwardly extending portion and the second opposing end defines a top rearwardly extending portion;

a base of generally upwardly directed channel-shaped configuration for supporting said tube, said base defining a pair of spaced upstanding ears near said second end pivotally supporting said tube intermediate its ends;

a ground support spike secured to and extending downwardly from said base, said spike being attached to said base at a point adjacent to and slightly forward of the point of said pivotal connection;

a canted washer slideably mounted on said spike, said washer having a hole formed therein on one edge;

a coil spring for biasing said tube for upward swinging movement about said pivotal connection and having upper and lower inwardly directed hooks at opposing ends, said lower hook engaging said hole formed in said washer, and said upper hook engaging a hole formed in the top rearwardly extending portion of said tube;

a ledge integral with said tube and having a narrow planar surface adjacent the forardly extending portion thereof and in a plane corresponding with the longitudinal axis of said tube;

a latch engageable with said ledge for holding said tube in generally parallel relationship with said base in opposition to the bias of said spring thereon, said latch comprising a rearwardly opening semi-circular hook and a downwardly extending shaft integral with the bottom end of said hook, a roller operatively engageable with said ledge and supporting said shaft in a radially extending position from a point on the outer circular surface of said roller, said roller rolling off said ledge in response to a tug on said line engaging hook;

a link pivotally mounted at one end to the center of said roller and pivotally mounted at its other end to the forward channel end of said base for swingably supporting said roller and said hook on said base, and a rearwardly and upwardly directed arcuate finger integral with said one end of said link for selective latching engagement with said hook shaft; said roller sliding off said ledge in response to said tug when said finger engages said shaft; and

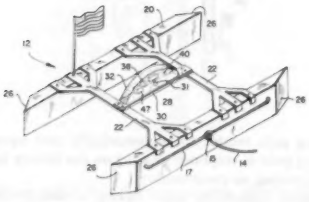
said latch being releasable in response to a tug on the fishing line engaged with said hook whereupon said spring swings said tube upwardly to lift the fishing pole carried thereby.

3,973,347

FLOATABLE FISHING DEVICE

Patrick Kearney, 49-07 169th Street, Flushing, N.Y. 11365

Filed Oct. 4, 1973, Ser. No. 403,636
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **1 Claim**



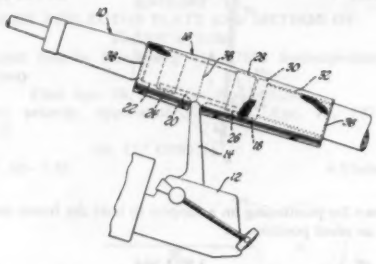
1. A floatable fishing device comprising a vertical support member mounted on a pair of braces, switch means including a pendulum having a pivoted end swingable from said vertical support member, a pair of disks secured to said vertical support member on either side of and spaced from said pivoted end, each of said disks being provided with a notch on its peripheral edge portion, a pair of microswitches secured to said vertical support member, each of said microswitches having a trip arm with a down turned end adapted to enter a respective notch on one of said disks upon swinging of said pendulum when said device is pulled downwardly depending on the swinging direction of said pendulum, thereby closing a respective one of said switches, an electrical power supply source, a pair of reflector lamps operable by the respective ones of said switches from said electrical power source and a translucent cover for said switches and said reflector lamps, said cover having a pair of differently colored portions, aligned forward of each of said reflector lamps.

3,973,348

REMOVABLE HAND GRIP FOR FISHING ROD HANDLE

Timothy F. Shell, 1023 N. Fourth, St. Clair, Mich. 48079

Filed Mar. 27, 1975, Ser. No. 562,724
Int. Cl.² A01K 87/00
U.S. Cl. 43—23 **9 Claims**



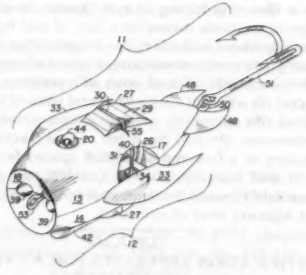
1. A removable hand grip for use on a fishing rod handle of the type that mounts a reel having a stem projecting outwardly from the handle, the grip having a sheet like construction made from a generally flexible cloth-like material, said grip having a pair of edge portions that overlap when the grip is wrapped around a fishing rod handle, each of said edge portions including a pair of flanges spaced longitudinally from each other so that when the flanges overlap each other the space between the pairs of flanges defines an opening for receiving the stem projecting from the handle so that the grip covers the handle around the stem, each of said overlapping edge portions being of a generally flexible cloth-like construction, and means for detachably securing the overlapping edge portions to each other to removably mount the grip on the handle.

3,973,349

FISHING LURE WITH TEMPERATURE SENSING AND THERMOSTATICALLY CONTROLLED DEPTH SELECTION AND GUIDANCE MEANS

Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752

Filed Dec. 4, 1974, Ser. No. 529,416
Int. Cl.² A01K 85/00
U.S. Cl. 43—42.03 **21 Claims**



1. An artificial fishing lure having temperature sensing and thermostatically controlled depth selection and guidance means adapted to cause said fish lure to seek and hold predetermined thermal stratum in a body of water where fish of a selected species may be expected to be found, said thermally responsive fishing lure comprising:

A. a fish lure body fabricated from buoyant material and provided with

1. conventional exterior features such as shape, appearance, fins, tow means, and fish hook means, and

2. a central internal apparatus housing cavity within said fish lure body, and with

B. a bimetallic heat sensitive spiral shaped thermostatic element mounted in said central internal apparatus housing cavity within the fish lure body at a location where the thermostat element can be wetted by and thermally responsive to samplings from the surrounding water; with the thermally induced rotary motion being transmitted to

C. an associated pair of left and right lateral elevator fins positioned on the left and right sides of said fish lure body so that temperature induced rotary motion in the spiral thermostat element will rotate said lateral fins up or down to cause said fish lure to climb or dive in response to sensed temperature in the surrounding water; and with

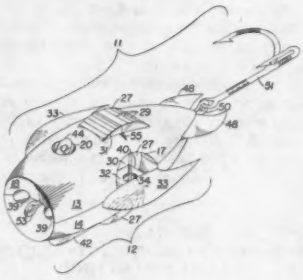
D. interchangeable attachable-detachable fins to enable the fisherman to tailor the decorative ornamentation features of said fish lure to comply with his own preferences or the appearance that the fisherman thinks will be attractive to the fish he hopes to catch.

3,973,350

FISHING LURE WITH PRESSURE SENSING AND HYDROSTATICALLY CONTROLLED DEPTH SELECTION AND GUIDANCE MEANS

Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752

Filed Dec. 19, 1974, Ser. No. 534,624
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.03 **20 Claims**



1. An artificial fishing lure having pressure sensing and hydrostatically controlled depth selection and guidance means adapted to cause said fish lure to seek and hold a predetermined depth in a body of water where fish of a selected species may be expected to be found, said hydrostatically responsive fishing lure comprising:

A. a fish lure body fabricated from buoyant material and provided with

1. conventional exterior features such as shape, appearance, fins, tow means, and fish hook means, and

2. a central internal apparatus housing cavity within said fish lure body, and with

B. a hydrostatic pressure sensitive rotary piston and compressible gas rotary piston chamber apparatus mounted in said central internal apparatus housing cavity within the fish lure body at a location where the pressure sensitive apparatus can be subject to and hydrostatically responsive to the pressure at various depths in the water; with the hydrostatically induced rotary motion being transmitted to

C. an associated pair of left and right lateral elevator fins positioned on the left and right sides of said fish lure body so that hydrostatically induced rotary motion of the rotary piston will rotate said lateral fins up or down to cause said moving fish lure to climb or dive in response to sensed static pressure of the water; and with

D. interchangeable attachable-detachable fins to enable the fisherman to tailor the decorative ornamentation features of said fish lure to comply with his own preferences or the appearance that the fisherman thinks will be attractive to the fish he hopes to catch.

3,973,351

FISHING LURE

Joseph G. Doiron, Warwick, Mass. 01378

Filed Apr. 10, 1975, Ser. No. 566,801
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.06 **1 Claim**

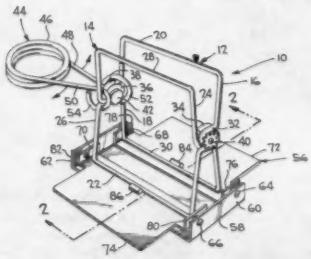
1. A fishing lure comprising a thick walled hollow tubular member of substantially circular cross section having a forward end portion and rear end portion, a slanting flat surface at the front end portion, said surface being at an acute angle with respect to the axis of the hollow tubular member, a slanting surface at the rear end portion of the lure, said surface being parallel to the slanting surface at the front end portion, the front end and the rear end being relatively sharp and the rear end portion extending downwardly below the lower surface of the tubular member, said rear end portion that extends downwardly presenting a smooth downward curve from the rear end of the slanting flat surface at the rear end portion, and a curve from the surface of the tubular member at the rear of the lure to and intersecting the said smooth curve from the rear end portion.

3,973,352

ANIMAL-RUN TRIGGER ASSEMBLY FOR ROTATING-FRAME TYPE ANIMAL TRAPS

Anthony J. Souza, and J. Hibbard Robertson, both of Lititz, Pa., assignors to Woodstream Corporation, Lititz, Pa.

Filed Sept. 22, 1975, Ser. No. 615,672
Int. Cl.[2] A01M *23/26*
U.S. Cl. 43—92 **20 Claims**



1. An animal trap assembly comprising in combination: a rotating-frame type trap including a pair of similar frame members, each having sides forming jaws and transverse ends therebetween, said frame members being pivotally connected intermediately of adjacent sides for relative rotation between set and closed positions about a common pivot axis extending transversely between the sides;

actuator means operatively connected to said sides of the frame members for forceably moving said transverse ends

from said set position through pivotal movement about said pivot axis to said closed position and normally imposing closing force through said sides when the trap is set; and

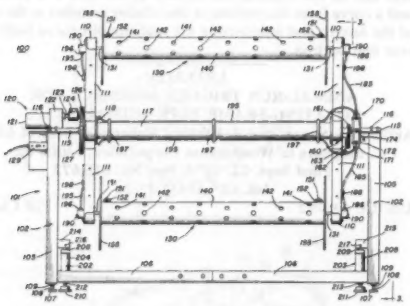
a treadle assembly having means for retaining the frame members in a set position in opposition to said actuator means when the trap is set, said treadle assembly comprising a base for resting on a support surface and defining an animal run therethrough which has two opposed approaches and includes one of each of a respective pair of the transverse ends of the respective frame members of the set trap, and actuating-lever means displaceably supported on said base and including an effective actuating-lever-area extending transversely and upstream of the respective approaches to the animal run defined by said base, said actuating-lever means including abutment means for engaging a respective transverse end of a respective frame member for normally absorbing the force of the actuator means of a set trap and positioning said actuating-lever-area in a triggering condition whereby minimal impact in the actuating-lever-area will displace the abutment means, release the transverse ends of the respective frame members, and permit the actuator means to forceably urge the transverse ends of the respective frame members toward a closing position projected toward each of the approaches to the animal run.

3,973,353

PLANT GROWTH ACCELERATING APPARATUS

Richard R. Dedolph, Naperville, Ill., assignor to Gravi-Mechanics Co., Naperville, Ill.

Filed May 29, 1974, Ser. No. 474,269
Int. Cl.² A01G *31/02, 9/10*
U.S. Cl. 47—1.2 **40 Claims**



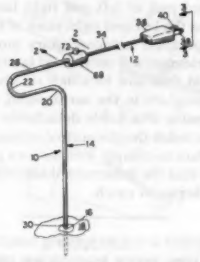
1. Plant growth accelerating apparatus comprising a mounting stand, a plant bed, means to mount said plant bed on said stand for turning about the longitudinal axis of said plant bed, drive structure for turning said plant bed about said longitudinal axis, said longitudinal axis of said plant bed being normally arranged substantially horizontally as said plant bed turns about said longitudinal axis while relatively high light intensities are incident on said plant bed, and means for periodically and alternately tilting the longitudinal axis of said plant bed as said plant bed turns about said longitudinal axis while relatively low light intensities are incident on said plant bed to impart thereto a slope with respect to the horizontal of from about 0.01 to about 0.25 to decrease the respiration rate of plants growing on said plant bed.

3,973,354

ELECTRIC WORM COLLECTING APPARATUS

John Schommer, 1184 Bryan, Tustin, Calif. 92680

Filed June 23, 1975, Ser. No. 589,458
Int. Cl.² A01M *1/00*
U.S. Cl. 47—1.3 **16 Claims**



1. An electric worm collecting apparatus, which comprises:

a. an electrically conducting element,
said element having a first portion adapted for inserting into the ground and having a second portion for receiving an electrical connection,

b. insulating means for insulating portions of said element other than said first and second portions, and

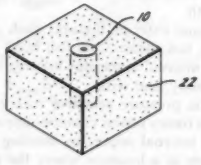
c. means adapted for connecting said second portion of said element to a voltage source,
said means including means for converting voltage from a voltage source to a pulsating voltage of a single polarity whereby when said first portion of said element is inserted in the ground a pulsating, nonoscillating current is caused in the ground adjacent to said first portion to cause worms to come to the surface.

3,973,355

SELF-CONTAINED HYDROPHILIC PLANT GROWTH MATRIX AND METHOD

John H. McKenzie, Houston, Tex., assignor to Agritec Co., Houston, Tex.

Continuation-in-part of Ser. No. 434,823, Jan. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 222,119, Jan. 31, 1972, abandoned. This application June 11, 1975, Ser. No. 585,915
Int. Cl.² A01G *9/10*
U.S. Cl. 47—37 **28 Claims**



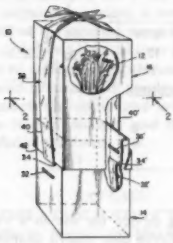
20. A self-contained live plant growth mixture comprising, from about ½ to about 3% by weight of a particulate, water insoluble, water swellable cross-linked polymer, and the remainder particles of plant growth material, the water swellable polymer being gelled and coating the plant growth particles and binding them into a cohesive mass.

3,973,356

FLOWER CADDY

Louis L. Schacht, 278-3B Crosse Drive, Cranbury, N.J. 08512

Filed Oct. 16, 1975, Ser. No. 622,884
Int. Cl.² B65D *85/50*
U.S. Cl. 47—41 R 10 Claims



1. A caddy adapted for the packaging, transporting and displaying of flowers comprising receptacle means for containing the stem portions of the flowers, cover means for surrounding the blossom portions of the flowers, said cover means being adapted for slidable interfit over the receptacle means and for selective positioning with respect to the receptacle means, fastening means for securing the cover means to the receptacle means at selected heights, the caddy being adjustable in accordance with the dimensional features of the article to be packaged, said fastening means further providing integral handle means for carrying the caddy whereby the caddy provides an enclosed protective package suitable for the delivery of flowers.

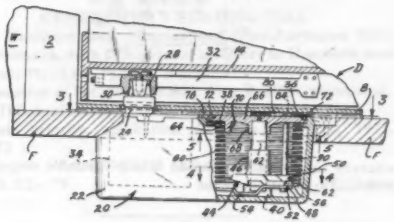
3,973,357

DOOR CLOSER WITH SWITCH ACTUATED THEREBY

Thomas J. Kluempers, Affton, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.

Filed July 15, 1974, Ser. No. 488,656
Int. Cl.² G08B *13/08*
U.S. Cl. 49—13 10 Claims

1. A door closer for supporting a door above a floor and for moving the door to a closed position with respect to a door opening, said door closer comprising: a case mounted firmly on the floor; a rotatable spindle projecting upwardly from the case and supporting the door, the spindle being nonrotatively connected to the door so that the door pivots about the axis of the spindle and rotates the spindle as the door opens and closes; a rotatable element which rotates about a fixed axis in the case, the axis of the rotatable element being offset from the axis of the spindle; connecting means between the spindle and the rotatable element for rotating the rotatable element in response to rotation of the spindle, and vice-versa; spring means connected to the rotatable element for returning the rotatable element to a home position; a bar magnet carried by



the rotatable element and having at least one pole located outwardly from the axis of rotation for the rotatable element so that said one pole describes an arc as the rotatable element revolves, the longitudinal axis of the bar magnet being located at an angle with respect to the plane in which the arc lies; and a switch mounted in a normally fixed position with respect to the case, said position being adjacent to the arc described by said one pole of the magnet, the switch being sensitive to a magnetic field, whereby when said one pole of the magnet moves adjacent to the switch, the switch will be actuated to indicate a selected position of the door.

3,973,358

Patent Not Issued For This Number

3,973,359

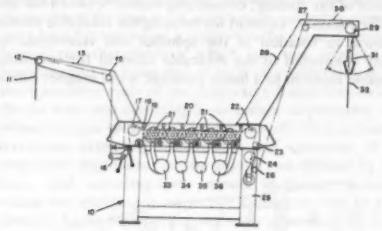
WEB ABRADING ASSEMBLY

John Spencer, Worcester; Ferdinand Ruepp, Linwood, and Robert Whewell, Northboro, all of Mass., assignors to David Gessner Company, Worcester, Mass.

Filed June 23, 1975, Ser. No. 589,413
Int. Cl.² B24B *7/12*, *55/06*; D06C *11/00*
U.S. Cl. 51—75 5 Claims

1. Apparatus for abrading a continuous web of material forming an abrading assembly comprising a shaft, cylindrical member supporting means mounted on said shaft, a plurality of cylindrical members circumferentially spaced from each other and equally radially spaced from said shaft mounted on said cylindrical member supporting means, and abrasive means on said cylindrical members to engage and abrade a continuous web of material upon shaft rotation and means on

said cylindrical member supporting means for releasably engaging said cylindrical members for wear adjustments



whereby said members abrade in non-rotatable engagement with said supporting means.

3,973,360

CAM CONTROLLED GRINDING MACHINE

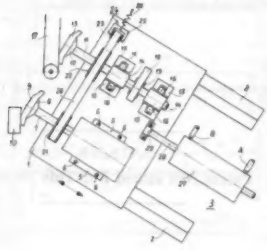
René Crevoisier, 2714 Les Geneva, Switzerland

Filed Dec. 10, 1974, Ser. No. 531,364

Claims priority, application Switzerland, Dec. 10, 1973, 17263/73; Jan. 28, 1974, 15792/74

Int. Cl.² B24B *17/08, 21/02*

U.S. Cl. 51—101 R 9 Claims



1. A machine for grinding small mechanical parts comprising a rigid frame, a rotatable flat grinding surface mounted on said frame, a cam rest carried by said frame and having a flat surface parallel with the flat grinding surface, a carriage mounted on said frame for reciprocal movement in a direction perpendicular to said flat grinding surface, a rotary guide cam carried by said carriage, a workpiece support mounted for rotation about an axis parallel to the axis of rotation of the guide cam, means for rotating said guide cam and said workpiece support in synchronism, and a drive device mounted on said frame for moving the carriage towards and away from the flat grinding surface, said drive device comprising a first control device for moving said carriage and a second control device for regulating the pressure with which the workpiece is applied to the flat grinding surface, said second control device being included in the first control device.

3,973,361

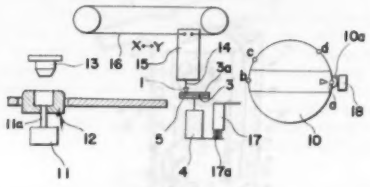
STYLUS GRINDING DEVICE FOR VIDEO DISC PLAYER

Masaru Yamano; Hironosuke Ikeda, both of Hirakata; Ichiro Takahara, Kadoma; Toshiyuki Kudo, Hirakata; Kazuo Ito, Takarazuka, and Makoto Yamada, Katano, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed July 11, 1975, Ser. No. 595,117

Int. Cl.² B24B *19/16*

U.S. Cl. 51—241 R 6 Claims



1. A stylus grinding device for use in a video disc player utilizing a flexible foil-type disc record adapted to be rotated at its center at a high speed while said disc record hovers on a rotation-induced air cushion above a stationary support, said video disc player including a pickup assembly having a pickup stylus engageable in the spiral groove on said disc record to reproduce video information recorded therein during rotation of said disc record, said grinding device comprising:

a rotary grinding disc for grinding said pickup stylus;

means for controlling rotation of said rotary grinding disc;

means for transferring said pickup assembly from a first position where said pickup stylus is situated above said disc record, to a second position where said pickup stylus is positioned above said rotary grinding disc, said transferrence being carried out while said pickup stylus is separated from said disc record;

means for engaging said pickup stylus to said rotary grinding disc, when said pickup assembly is in said second position, whereby causing said rotary grinding disc to contact against said pickup stylus under a predetermined contact pressure; and

means for varying a grinding condition to be subjected to said pickup stylus, which has been engaged to said rotary grinding disc, when the duration of actual service of said pickup stylus attains a predetermined value.

3,973,362

SANDING SHOE

Joseph R. Groshans, Clinton, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

Filed June 6, 1975, Ser. No. 584,577

Int. Cl.² B24D *17/00*

U.S. Cl. 51—386 4 Claims

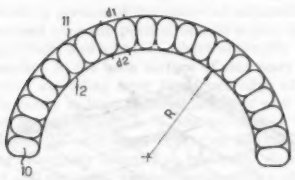
1. A sanding show comprising an elongated rectangular rigid base plate adapted for attachment to a reciprocable carrier in a sanding tool, the base plate having squared ends, a resilient pad fixed to the underside of the base plate providing a resilient backing for a sheet of sandpaper stretched over its bottom surface, and separate clamping means mounted upon opposite end areas of the upper surface of the base plate for clamping in place opposite ends of the sandpaper extended over corresponding ends of the base plate into the clamping means, wherein the clamping means at each end comprises a

stationary lower jaw upon the base plate, an upper jaw movable angularly to and from a clamping relation with the lower jaw, the upper jaw depending from one end of a leaf spring back section that is fixed at its opposite end to the base plate, the back section biasing the upper jaw to a normally unclamped open condition relative to the lower jaw, a manipulative pivotable lever having a power arm from which is offset at right angles a camming arm abutting upon the back section, a bearing support upstanding from the base plate providing a bearing surface for pivoting of the camming arm, the camming arm being pivotable to cam the upper jaw angularly downward into clamping condition with the lower jaw upon actuation of the power arm angularly upward, a mounting tab extending from a lower end of the bearing support fixed upon the base plate having a curved end hooked over an adjacent end of the base plate so as to define a smooth rounded bulbous surface over which an end of a sheet of sandpaper may be extended and passed between the upper and lower jaws, and the tab having between its curved end and the bearing support a raised tooth defining the lower jaw.

3,973,363
INFLATABLE STRUCTURES

Robert Josse LaPorte, Nogent-sur-Marne, and Pierre Maurice Malachard des Reyssiers, Paris, both of France, assignors to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes, Colombes, France

Continuation-in-part of Ser. No. 249,278, May 1, 1972. This application Nov. 30, 1973, Ser. No. 420,709
Claims priority, application France, Nov. 3, 1969, 69.37805
Int. Cl.[2] E04B *1/345*
U.S. Cl. 52—2 **2 Claims**



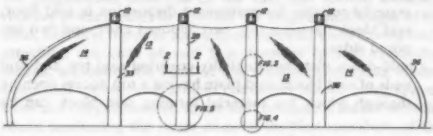
1. An inflatable structure comprising a plurality of inflatable enclosures, each of said enclosures having a wall which is part-spherical in shape, and two layers of flexible material fixed to said enclosures at points on opposite sides of said spheres, each of said layers comprising a plurality of discrete elongated members of flexible material held permanently under tension when said enclosures are inflated, the distance between the points at which one of said layers is fixed to said enclosures being greater than the distance between the points at which the other of said layers is fixed to said enclosures, so that inflation of said enclosures results in a curved structure.

3,973,364
REINFORCED SEALED JOINT FOR MEMBRANE SEGMENTS

Norman R. Seaman, Sarasota, Fla., assignor to Seaman Corporation, Sarasota, Fla.

Filed Oct. 28, 1975, Ser. No. 625,842
Int. Cl.[2] E04B *7/14, 1/347;* A45F *1/16*
U.S. Cl. 52—57 **10 Claims**

1. In a sealed joint structure connecting adjoining segments of flexible membrane, an upright truss member forming part of a dome framework and having an outer chord, means detachably connecting the adjoining edges of two segments to said truss outer chord, a weatherseal strip of flexible membrane overlying and coextensive with said truss outer chord and overlapping the adjoining edges of said segments, and tensioning outer cables secured to the outer edges of said strip

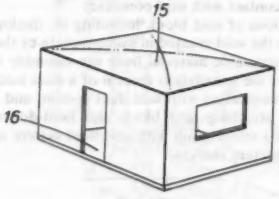


and anchored to the base of said framework to bear on and hold down the membrane segments against uplift loads.

3,973,365
CEMENTITIOUS BUILDING CELL

Phillip Handford Boot, Mosman, and Peter Edgington Ellen, Turramurra, both of Australia, assignors to Handford Boot Patents Pty. Ltd., Pymble, Australia

Continuation of Ser. No. 358,802, May 9, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,728
Claims priority, application Australia, May 10, 1972, 8905/72
Int. Cl.[2] E04H *1/02;* E04B *1/32*
U.S. Cl. 52—79 **15 Claims**



1. A transportable structurally stable cementitious building cell for the construction of a building, said cell being structured to form at least part of a room of said building, said cell comprising at least three substantially planar, substantially vertical walls having an average thickness of about ¼ inch to 2 inches except in minor areas of localized thickening, a substantially rectangular in plan, double continuous curved thin shell dome roof having substantially the structural action of a double curved thin shell dome, said dome being free of a major ridgeline, and extending upwardly in a curve from the tops of each of said walls, said roof having a rise to chord ratio not greater than 1:10 and not less than 1:60, the thickness of said roof being from about ¼ inch to 2 inches except in minor areas of localized thickening, a continuous edge stiffening member joining said roof to the top of said walls and serving to stiffen the edges of the roof to form, together with said walls and said roof, a structurally stable building cell, and a floor joined to the bottom of said walls, wherein the top of the roof of said cell, when the cell is in an unsupported, free standing condition and at least seven days after casting same, when loaded for about 2 hours with an evenly distributed load of about 30 pounds per square foot, will exhibit substantially full recovery after load removal.

3,973,366
COMPOSITE PRESET BLOCK FOR UNDERFLOOR WIRE DISTRIBUTION SYSTEMS

David A. Balane, Franklin, and Herman P. Manzeck, Belgium, both of Wis., assignors to Inryco, Inc., Melrose Park, Ill.

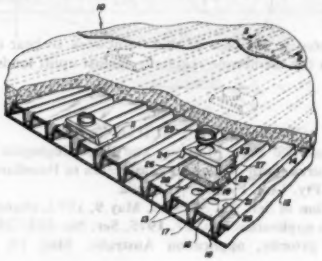
Filed Mar. 4, 1974, Ser. No. 447,580
Int. Cl.[2] E04F *17/08, 19/08*
U.S. Cl. 52—99 **7 Claims**

1. A composite preset block assembly adapted to be embedded in and covered by a concrete floor above an underfloor

wire distribution duct system, which assembly is convertible to a duct outlet communicating with said system, comprising:

a block of a thermally insulating fire-resistant rupturable material suitable for permanent disposition in said floor, said block having a top, two opposed ends, and two opposed sides;

a hold-down plate substantially covering said top and said ends of said block, said plate having a top access opening through which the material forming said block can be



removed, said two sides of said block being substantially open to contact with said concrete;

the dimensions of said block including its thickness being such that the void created in said concrete by the removal of said rupturable material from the assembly is suitable in size for the installation therein of a duct outlet assembly communicating with said duct system; and

means for attaching said block and hold-down plate in contiguous relationship with said duct system and covering an aperture therein.

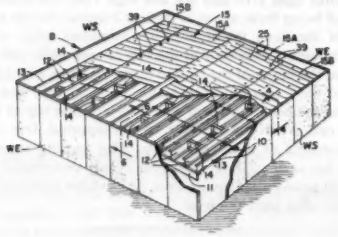
3,973,367
ROOF STRUCTURE WITH MEANS TO RESIST LATERAL FORCES

Donald L. Johnson, Independence; Donald L. Broyles, Raytown; Gregory J. Stervinou, Kansas City; Barton Bigge, Independence, and David Reynolds, Kansas City, all of Mo., assignors to Butler Manufacturing Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 444,285, Feb. 21, 1974, abandoned. This application Feb. 13, 1975, Ser. No. 549,696

Int. Cl.[2] E04B *7/00;* **E04D** *13/00*

U.S. Cl. 52—262 **13 Claims**



1. A roof structure for a building construction, said building having opposite side walls and opposite end walls, said roof structure having means to assist the building to resist lateral forces imposed on the building, comprising a primary frame means including transversely extending roof beams supported on the side walls, a secondary frame means including a plurality of elongate roof purlins each having a web and being secured on the roof beams substantially transverse to the axes of the roof beams so that said web extends substantially perpendicular to said roof beams, a plurality of roof panels secured on the roof purlins, a plurality of elongate roof brace means each having end faces on the opposite ends thereof which are presented away from each other, each of said end faces being secured to a web of one of a pair of adjacent roof purlins so that each of said brace means is oriented to be substantially perpendicular to the longitudinal axes of the roof purlins, said plurality of brace means each transmitting therethrough compressive forces which are applied thereto via the webs of said adjacent purlins so that said pluralilty of brace means prevent rotation of the roof purlins about their longitudinal axes, and means connecting said purlins to said end walls, said roof thus being rigid and able to transmit compressive forces directed substantially perpendicular to said purlin webs and created by lateral forces imposed on the side walls of the building to the end walls, which act in shear to resist the lateral forces, and means securing the panels to the purlins and to one another, including means at opposite ends of the panels to enable relative movement between the panels to thus enable thermal expansion and contraction of the panels even though said roof structure is rigidified.

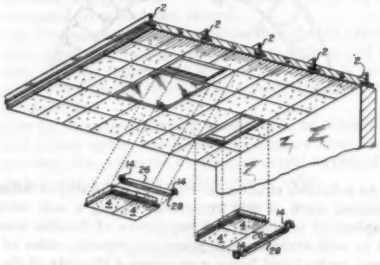
3,973,368
CEILING TILE ASSEMBLY

Wolfgang W. Moeller, 4 Glen Cove Drive, Glen Head, N.Y. 11545

Filed Dec. 23, 1974, Ser. No. 535,863

Int. Cl.[2] E04B *5/52*

U.S. Cl. 52—476 **9 Claims**

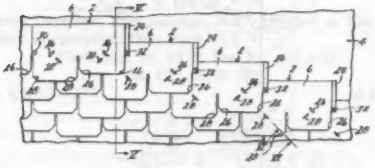


1. In a modular ceiling tile assembly having a zone occupied by ceiling tile having a curf in at least one side thereof, said zone defined by ceiling tile main runners interconnected by cross members, said cross members having a generally horizontal lip protruding towward said zone, the improvement wherein a first tile is juxtaposed to a second tile, said first tile supported by the horizontal base of a first spline, said second tile supported by a horizontal base of a first spline, said second tile supported by a horizontal base of a second spline, said first spline and said second spline running parallel to one another, each of said splines having a generally vertical riser attached to a generally horizontal base, said splines being removably connected at at least one end thereof to a generally horizontal lip of a cross member by a movable clip, said clip being disposable over said horizontal lip of said cross member to rest thereon, the vertical riser of said first spline being positioned back-to-back the vertical riser of said second spline, each of said vertical risers being inclined angularly toward its base to define an angle between 85° and 45°C, each of said splines being slotted.

3,973,369
ROOFING SHINGLE

Robert L. Smith, Newkirk, Okla., assignor to Billy G. Powers, Arkansas City, Kans., a part interest

Filed Apr. 14, 1975, Ser. No. 568,049
Int. Cl.² E04D *1/20, 1/26, 3/62*
U.S. Cl. 52—526 5 Claims

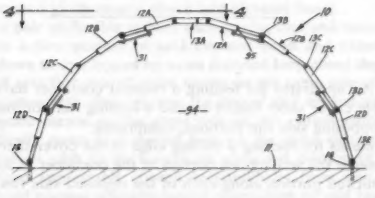


1. A roofing shingle comprising a generally rectangular body sheet of flexible roofing material having at least one tab at its lower edge, like shingles being adapted to be applied to a roof in side-by-side abutting relation in a horizontal course transverse to the slope of said roof, and in successively higher like courses each overlapping the outer surface of the next lower course, the tabs of each course being horizontally staggered with respect to the tabs of adjoining courses, each tab of each shingle having a pair of apertures formed therethrough in horizontally spaced apart relation and in spaced apart relation above the lower edge of said tab, each of said apertures being adapted to receive therein a lower edge portion of one of the two tabs of the shingles of the next higher course of shingles overlapping said tab, each of said apertures being so formed that when the lower edge of a next higher tab is inserted therein, a portion of the lower tab adjacent said aperture is disposed over the portion of said higher tab inserted into said aperture, and a backing sheet of flexible waterproof material applied to the back surface of said body sheet, said backing sheet extending from the upper edge of said body sheet downwardly at least to an elevation of said body sheet below said apertures, and to a portion of said body sheet which overlaps the next lower course of shingles, said cover sheet being effectively adhered to said body sheet except in the area of said apertures and in a continuous path from said apertures to the lower edge of said backing sheet, whereby any moisture passing downwardly through said apertures is conveyed between said body and backing sheets to the lower edge of said backing sheet, where it is deposited on the outer surface of the next lower course of shingles.

3,973,370
METHOD OF MAKING A FRAME ASSEMBLY

Jack G. McAllister, 2701 N. Douglas Drive, Minneapolis, Minn. 55422

Filed May 22, 1972, Ser. No. 255,688
Int. Cl.² E04B *1/32*
U.S. Cl. 52—745 24 Claims

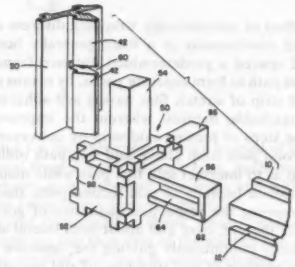


1. A method of making a frame assembly over a surface comprising: arranging on the surface a plurality of struts, some of the struts being outer struts, each strut having a first member extended in a longitudinal direction and a second member extended in the longitudinal direction of the first member, said first and second members being longitudinally movable along the longitudinal direction of the first and second members relative to each other to increase the longitudinal length of the strut, said first member and second member each having ends, attaching the ends of said first member to first connector means, attaching the ends of the second member to second connector means, said second connector means being spaced from and only connected to the first connector means with the struts, anchoring the outer ends of the first members of the outer struts, elongating the struts by longitudinally moving the first and second members relative to each other whereby said struts and first and second connector means move away from the surface erecting the frame assembly over the surface, and holding the struts in their elongated positions.

3,973,371
FURNITURE AND WALL STRUCTURAL SYSTEM

Stephen M. Heller, 2300 Bridgeway, Sausalito, Calif. 94965

Continuation-in-part of Ser. No. 516,539, Oct. 21, 1974, abandoned. This application Sept. 12, 1975, Ser. No. 612,836
Int. Cl.² E04C *3/04;* E04B *1/58*
U.S. Cl. 52—758 H 9 Claims



4. Apparatus for constructing a skeletal framework adapted to support wall, furniture or other structural panels, said apparatus comprising:

a plurality of elongate channel members each having a generally rectangular cross section, one side of each of the channel members defining axial slot means extending the length thereof and the other opposite side having a pair of orthogonal flanges extending from each edge thereof, said flanges being coplanar with the sides of the channel member forming the associated edge;

a plurality of generally flat elongate cover plates each having elongate, ridged tongue means extending from one side thereof along the length of the cover plate and projecting through the slot in one of the channel members engaging and latching the channel member with the cover plate, said tongue means each having a notch adjacent each end thereof, said cover plates each having a pair of orthogonal flanges extending from each edge thereof, one flange of each pair being coplanar with the cover plate and the other flange of each pair directed opposite from the tongue means so that each engaged cover plate and channel member in combination provide a skeletal frame member having four orthogonal recesses on the respective sides of the frame member defined by adjacent pairs of flanges; and

a plurality of spline members each having a generally cubical block portion and at least two orthogonal extensions from the block portion each projecting inside one end of a channel member, said extensions including transverse ridges fitting within the notches in the tongue means of cover plates engaged with the respective channel members to lock the frame members formed thereby into a

skeletal framework having a plurality of recesses for supporting the structural panels.

3,973,372

METHOD FOR AUTOMATICALLY PACKING GOODS

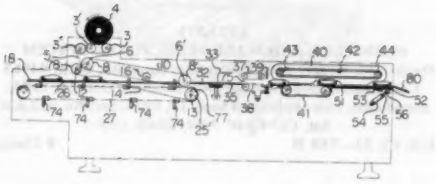
Shozo Omori, No. 7-4, Negishi 5-chome, Taito-ku, Tokyo, Japan

Filed Oct. 23, 1974, Ser. No. 517,321

Claims priority, application Japan, Dec. 14, 1973, 48-138678; Dec. 14, 1973, 48-138679; Apr. 17, 1974, 49-42310; May 28, 1974, 49-59895; May 28, 1974, 49-59896

Int. Cl.² B65B *11/22*

U.S. Cl. 53—33 3 Claims



1. Method of automatically wrapping discrete quantities of goods fed continuously in a fixed generally horizontal first path and spaced a predetermined distance from each other along said path to form separate packs, by means of a continuously fed strip of stretch film having self-adhering and resiliently stretchable natures, wherein the improvement comprises the steps of feeding said strip by conveyor means in a fixed second path from above said first path obliquely downwardly so as to intersect said first path while maintaining said strip tensioned laterally of said second path, thereby successively wrapping the respective quantities of goods from the upper side thereof, over and about both lateral sides thereof, subsequently continuously guiding the opposite longitudinal side edge portions of said strip toward and around the bottom side of the goods into overlapping relation so as to form a cylindrical tubular shaped enclosure of said goods, pressing together the overlapping longitudinal side edge portions of said strip to secure said overlapping edges together at and along the bottom side of said enclosure thus wrapping therein said quantities of goods, and sequentially severing said enclosure transversely thereof intermediate said quantities to thus form discrete packs each having a leading and a trailing ear portion of said enclosure, and sequentially folding said leading and trailing ear portions beneath and upon the bottom side of each respective pack for sealing thereto.

3,973,373

AUTOMATIC PACKAGING METHOD AND APPARATUS

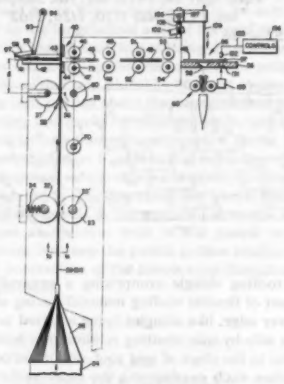
Winfried Wilbur Williams, Sr., Salisbury, and David Clancy, Canaan, both of Conn., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,093

Int. Cl.² B65B *63/04*

U.S. Cl. 53—120 20 Claims

17. Apparatus of the type wherein a continuously moving web is longitudinally folded and lengths of the folded web are severed from the leading end, transversely folded and thrust into receptacles positioned in timed relation at an insertion station, characterized by longitudinal fold means disposed to receive a moving web from a supply and provide a longitudinally folded leading end on the web, web feed means, means for severing said continuously moving leading end into successive longitudinally folded strips of predetermined length, first transverse fold means for transversely folding each said strip in turn, means for directly receiving each transversely folded strip and moving it away from said first transverse fold means and advancing it into an insertion station, means at said insertion station for imparting a second transverse fold to each strip in turn and thrusting it into a receptacle positioned at said



station, and means at said station for detecting the operative presence or absence of a first folded strip.

3,973,374

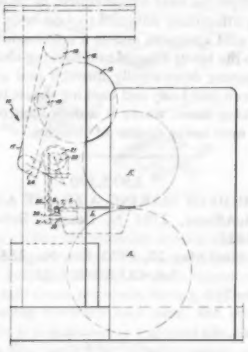
CLOSURE MECHANISM FOR FOOD TRAY COVERS

Andrew W. Anderson, West Caldwell, and John P. Mullin, Scotch Plains, both of N.J., assignors to Scandia Packaging Machinery Company, Clifton, N.J.

Filed Mar. 3, 1972, Ser. No. 231,589

Int. Cl.² B65B *7/28*

U.S. Cl. 53—333 6 Claims



1. An apparatus for feeding a rimmed container having a flexible cover sheet folded around a leading rim portion and two opposing side rim portions, comprising:

a. means for tucking a trailing edge of the cover sheet beneath the trailing rim portion of the container to form a tucked portion along each of the opposed side rim portions,

b. means for folding the remaining portion of the trailing edge of the cover sheet beneath the trailing rim portion of the container to form a neatly folded portion contiguous to each tucked portion,

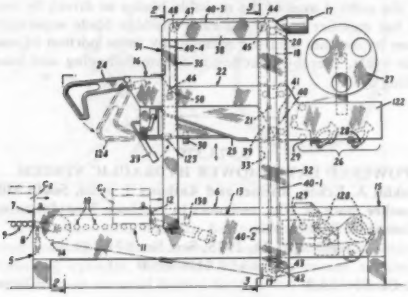
c. said folding means acting along the trailing rim portion between said tucking means and sequentially at a different period of time than the tucking means.

3,973,375

AUTOMATIC CARTON CLOSING MACHINE EQUIPPED WITH BALANCING TETHER SUSPENSIONS OF THE ELEVATING FLAP-FOLDING AND FLAP-ANCHORING HEAD

Winton Loveland, Fort Salonga, N.Y., assignor to The Loveshaw Corporation, Deer Park, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,093
Int. Cl.² B65B 7/20
U.S. Cl. 53—374 8 Claims



1. In an automatic carton closing machine for folding down and inward upwardly extending top flaps of cartons being transported longitudinally therethrough along a lateral path defined by a lateral base structure, the combination with an upwardly and downwardly movable elevator head for effecting the folding of such top flaps when in the vicinity of the top of such a carton and the latter passes forward along the carton lateral path, said elevator head being appreciably elongated longitudinally in the direction of the carton lateral path with support thereby in longitudinal succession of both flap folding equipment and folded flap anchoring equipment to hazard longitudinal tipping resulting from unbalanced longitudinal distribution of forces, of

1. an elevator head-supporting tower structure comprising a plurality of upright members supported by the base structure and located on opposite sides of the carton lateral path, means defining upwardly extending guide tracks on at least some of said tower upright members located to opposite sides of the carton lateral path and movably engageable by follower means carried by said elevator head on opposite sides of said path for up and down motion of said head while constraining its movement in the direction generally parallel to the carton path, said tower and base structures carrying at least a pair of transversely separated flexible-tether guide means located to opposite sides of said carton path below said elevator head and a second pair of such transversely spaced guide means above said elevator head;
2. a pair of flexible tethers each having one end anchored to a first portion of said elevator head and extending down to and lapped up as an inverted loop about the one of said first pair of guide means on the same side of said carton path, then up over the one of said second pair of guide means on the same side of this carton path and finally down as a second loop on the same side of this carton path to anchorage on a second portion of said head appreciably spaced longitudinally from said first head portion whereby lateral orientation of said head is maintained in up and down elevating movement of the latter;

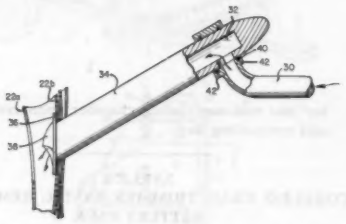
and power driving means connected to said head to lift and lower the latter.

3,973,376

APPARATUS FOR SUPPORTING AND OPENING PLASTIC BAGS

Heikki Samuli Suominen, Petsamonkatu 14, 33500 Tampere 50, Finland

Filed Mar. 11, 1974, Ser. No. 449,885
Claims priority, application Finland, May 2, 1973, 1379/73
Int. Cl.² B65B 43/36, 67/12
U.S. Cl. 53—385 8 Claims



1. Apparatus for the dispensing of bags formed of a flexible plastic material from a stack of such bags, each bag having aligned apertures in its opposing side walls and with one of said apertures being larger than the other,

said apparatus comprising a shank whose cross-sectional dimensions are less than that of the smaller bag aperture so that a stack of said bags is easily slideable along said shank,

a rigid circumferential flange at one end of said shank whose cross-sectional dimensions is slightly less than that of the larger bag aperture but larger than the smaller bag aperture,

and mounting means for the other end of said shank for supporting said shank in a downwardly inclined position with said flanged end lower, the downward inclination of said shank being sufficient to ensure that the stack of bags is urged downwardly to abut said flange,

said shank being detachably supported on said mounting means.

3,973,377

COMPACTING METHOD FOR STACKING BULK HAY

Ezra Cordell Lundahl, Idaho Falls, Idaho, assignor to Ezra C. Lundahl Inc., Logan, Utah

Division of Ser. No. 195,709, Nov. 4, 1971, Pat. No. 3,744,228.
This application Mar. 12, 1973, Ser. No. 340,409
The portion of the term of this patent subsequent to Oct. 30, 1990, has been disclaimed.
Int. Cl.² A01D 91/00
U.S. Cl. 56—1 1 Claim

1. The method of gathering crop comprising the steps of:

delivering loose crop into a wagon,

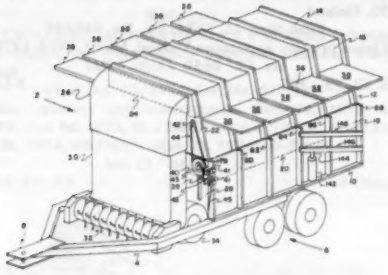
physically separating the interior of said wagon into a compacting chamber and an accumulator chamber,

compacting the crop in said compacting chamber,

delivering loose crop into said accumulator chamber during said compacting step,

maintaining the delivered crop in the accumulator chamber spaced from the crop in the compacting chamber during

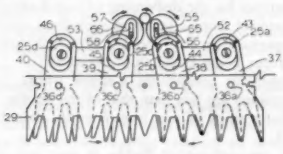
the compacting step, and
delivering accumulated crop from said accumulator chamber into said compacting chamber upon completion of said compacting step.



3,973,378
CORDLESS GRASS TRIMMER HAVING REMOVABLE BATTERY PACK

William E. Bartasevich; James E. Edgell; John E. Jones; Lynn D. Lineback, and Roger Q. Smith, all of Danville, Va., assignors to Disston, Inc., Danville, Va.

Filed Mar. 18, 1975, Ser. No. 559,566
Int. Cl.[2] A01D *55/26*
U.S. Cl. 56—11.9 11 Claims



5. A battery-operated grass trimmer comprising, in combination:

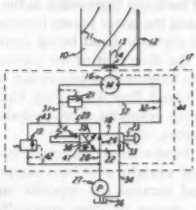
a. a base structure having appended handle and wheel means for manual movement over a lawn;
b. a fixed horizontal cutting blade formed of flat sheet metal and having a plurality of shaped teeth formed in groups on and extending from one long edge of a rectangular body portion thereof and being fixedly secured on the base structure with the teeth positioned forwardly thereof;
c. a plurality of horizontal coplanar movable cutting blades formed of flat sheet metal and being separately pivotally mounted on said fixed blade body portion for pivotal movement thereon about separate spaced apart axes of rotation, said movable blades having respective flat rearward body portions overlapping one side of the fixed blade for oscillatory motion thereon and respective integral forward end portions with respective groups of plural teeth formed therein, overlapping and slidably engaging respective mating groups of the fixed blade teeth, each said movable blade including in its respective rearward portion an opening rearward of its respective pivotal mount, said opening being adapted to engage reciprocating means to effect the oscillation of such blade;
d. a rechargeable battery mounted for support on said base structure;
e. a motor mounted on said base structure and having a drive shaft extending therefrom;
f. a manual control switch having connecting wiring for electrically connecting the battery to the motor to drive the shaft;
g. a plurality of linearly movable bar members adapted for continuous asynchronous linear reciprocating motion, each said bar member having means for engaging the opening of at least one movable blade rearward portion for oscillating the teeth of such at least one movable blade; and
h. connector means operated by said drive shaft and adapted for converting the continuous rotative motion of said drive shaft into a plurality of continuous asynchronous linear reciprocating motions, the number of said motions being equal to the number of said bar members and each of said motions being imparted to one of said bar members;

whereby the asynchronous reciprocating motions of said bar members serve to oscillate the respective movable blades so that the central axes of the movable blades so driven by one said bar member lead or lag each movable blade separately driven by another said bar member by some portion of one blade cycle, thereby effecting a counterbalancing and load leveling effect.

3,973,379
POWERED LAWN MOWER HYDRAULIC SYSTEM

Franklin A. Ecker, Racine, and Anthony J. Salia, South Milwaukee, both of Wis., assignors to Jacobsen Manufacturing Company, Racine, Wis.

Filed Apr. 24, 1975, Ser. No. 571,249
Int. Cl.[2] A01D *69/00*
U.S. Cl. 56—11.9 3 Claims

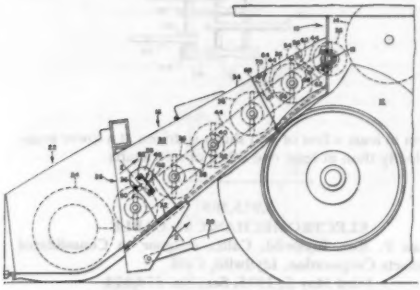


1. In a powered lawn mower including a reel-type lawn mower having a bed-knife and a rotatable reel, a hydraulic system including a hydraulic motor in driving relation with said reel for rotating the latter, and including a hydraulic pump and a hydraulic valve and a hydraulic system relief valve and hydraulic lines all hydraulically connected with said motor for supplying hydraulic fluid to said motor for operating said reel in a forward direction, the improvement comprising said motor being a reversible motor for operation in two directions of rotation which are the forward and reverse directions, said hydraulic valve having fluid passageways for directing hydraulic fluid to said motor for the two directions of rotation, the one of said fluid passageways for directing fluid to said motor in the reversing direction having a fluid-flow restrictor for limiting the reverse speed of said motor to less than the forward speed of said motor, and a second hydraulic relief valve in fluid-flow communication with said one fluid passageway and having a fluid pressure relief of a value less than that of said hydraulic system relief valve for relieving fluid pressure when said valve is in position for the reverse direction of rotation.

3,973,380
CROP FEEDING MECHANISM FOR A HARVESTING MACHINE

Melvin Louis Knollman; George Kent Cornish, both of East Moline, and Gene Roger Fowler, Geneseo, all of Ill., assignors to Deere & Company, Moline, Ill.

Filed July 16, 1975, Ser. No. 596,435
Int. Cl.² A01D *45/02*
U.S. Cl. 56—14.6 **4 Claims**



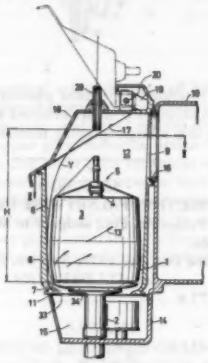
1. In a harvesting machine having a mobile body housing a crop treating mechanism including a transversely disposed threshing cylinder, a forward harvesting means adapted to remove crop material from a field as the machine advances, and a feeder mechanism disposed between the harvesting means and the threshing cylinder for conveying crop material from the harvesting means to the threshing cylinder and including a generally fore-and-aft housing having opposite side walls, an upwardly and rearwardly inclined floor, a series of more than three parallel axially transverse closely spaced paddle-type impellers extending between the side walls above the floor and having generally radial paddle members, the axes of the impellers lying generally in an upwardly and rearwardly inclined plane, the rearmost impeller being disposed so as to deliver crop material to the threshing cylinder and drive means operative to rotate the impellers so that the tips of the paddle members move rearwardly immediately above the floor, the improvement comprising: a first baffle member disposed adjacent the forward side of the rearmost impeller and extending between the opposite side walls of the housing whereby any tendency to backfeeding from the threshing cylinder and the rearmost impeller in the housing above the impellers is overcome and a second baffle member extending between the opposite side walls and disposed between the front impeller and the impeller immediately rearwardly thereof, each baffle member including at least a portion above said plane defined by the axes of the impellers and having a lower edge spaced from said floor.

3,973,381
COVER FOR YARN TWISTING MACHINE

Junichi Teranishi, Joyoshi, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Aug. 8, 1974, Ser. No. 495,660
Int. Cl.² D01H *11/00, 13/12, 1/10*
U.S. Cl. 57—58.83 **1 Claim**

1. A cover enclosing an overall multiple twisting machine including at least one rotary disc, said cover comprising a balloon cover having an upper section and a cover lid covering the upper section thereof, said balloon cover including an internal curved surface, the lower edge section of which curved surface is positioned lower than the lower edge section of the rotary disc of the multiple twisting machine, a cylindrical surface having a cross section which is concentric with the one rotary disc of the multiple twisting machine and which merges into the curved surface and diverges upwardly, an air exhaust port in the upper section of the balloon cover, said upper section of the balloon cover including a slanted truncated open surface lower at the front than at the rear of the balloon cover, said slanted truncated open surface being covered by said cover lid, hinge means securing the cover lid to the balloon cover at the rear of the slanted truncated open surface including a pair of lugs secured to the upper portion of the balloon cover at the opposite sides thereof and a covering plate secured to the upper portion of the balloon cover at the top thereof between the lugs including a portion in spaced relation to the uppermost portion of the cover lid in a closed position, support sections at each side of the cover lid secured to the uppermost portion of the cover lid at the rear thereof in the closed position of the cover lid whereby a portion of the support sections is adjacent the lugs on the balloon cover, pin



means extending between the lugs and support sections for pivotally securing the lugs and support sections together, stopper means secured to the covering plate for limiting opening pivotal movement of the cover lid, an opening in the covering plate at the rear of the balloon cover, a rod, means pivotally securing the rod to the upper portion of one of the support sections, the other end of which rod extends through the opening in the covering plate, and a compression spring sleeved over the rod between the support section and covering plate whereby the compression spring urges the cover lid in a closed position when the cover lid is closed and urges the cover lid in an open position when the cover lid is open, and a yarn guide cylinder carried by the cover lid which is adjustable axially with respect to the cover lid.

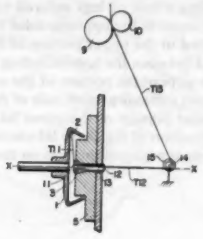
3,973,382
YARN GUIDE DEVICE FOR AN OPEN-END SPINNING MACHINE

Hironori Hirai, 8-1, Kaidenhigashi-Tsukamoto, Nagaokakyo, Kyoto, Japan

Filed Feb. 3, 1975, Ser. No. 546,735
Claims priority, application Japan, Feb. 12, 1974, 49-17400
Int. Cl.² D01H *1/12*
U.S. Cl. 57—58.89 **3 Claims**

1. A yarn guide device for an open-end spinning frame comprising a rotor rotatable at speeds in excess of 60,000 r.p.m. having an open end, a navel plate positioned over the open end of the rotor, a navel having an axially extending yarn guide opening therethrough secured in the navel plate on the axis of rotation of the rotor through which spun yarn is removed from the rotor axially of the axis of rotation of the rotor, a guide roller positioned on the opposite side of the navel plate from the rotor having an axis of rotation perpendicular to the axis of rotation of the rotor and a peripheral surface for initial engagement of yarn withdrawn from the rotor through the navel on the axis of rotation of the rotor and a cooperating delivery roller and nip roller positioned to receive the spun yarn from the guide roller to effect an angle of

spun yarn between the navel, guide roller and delivery and nip rollers of less than 90° which delivery and nip rollers have an axis of rotation parallel to the guide roller and perpendicular



to the axis of rotation of the rotor whereby rotational speeds of greater than 60,000 r.p.m. are effected without breaking of the spun yarn due to high spinning tension.

3,973,383

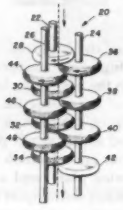
FRICTION FALSETWIST DEVICE

Jing-Peir Yu, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1974, Ser. No. 536,685

Int. Cl.² D02G *1/04*

U.S. Cl. 57—77.4 **6 Claims**



1. In a friction aggregate wherein at least three substantially parallel shafts are grouped around a yarn path extending from the inlet end to the outlet end of said aggregate, each said shaft supporting and driving at least one disc interleaved between discs on each of said other shafts, the disc diameters being large enough with respect to the spacing between said shafts that a yarn passing through said aggregate from inlet to outlet will follow a tortuous path as said yarn contacts and is deflected by successive discs, the improvement wherein a first of said discs has a smaller diameter than at least one other of said discs.

3,973,384

FRICTION AGGREGATE

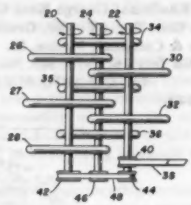
Jing-peir Yu, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 30, 1974, Ser. No. 537,167

Int. Cl.² D02G *1/04*

U.S. Cl. 57—77.4 **5 Claims**

1. In a friction aggregate wherein at least three substantially parallel shafts are grouped around a yarn path extending from the inlet end to the outlet end of said aggregate, each said shaft supporting and driving at least one friction disc interleaved between discs on each of said other shafts, the disc diameters being large enough with respect to the spacing between said shafts that a yarn passing through said aggregate from inlet to outlet will follow a tortuous path as said yarn contacts and is deflected by successive discs, the improvement



wherein at least a first of said shafts is driven at a lower angular velocity than at least one other of said shafts.

3,973,385

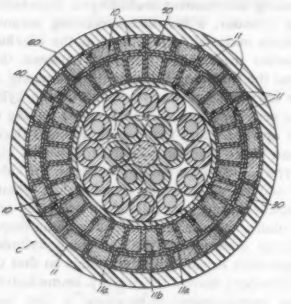
ELECTROMECHANICAL CABLE

Norman P. Roe, Idyllwild, Calif., assignor to Consolidated Products Corporation, Idyllwild, Calif.

Filed May 5, 1975, Ser. No. 574,611

Int. Cl.² D07B *1/10*; H01B *7/00*

U.S. Cl. 57—144 **4 Claims**



1. An electromechanical cable comprising:

a plurality of strain members arranged in inner and outer circumferential layers, the members in said two layers being helically twisted in mutually opposite directions;

said strain members being of substantially rectangular cross-sectional configuration, the members in said inner layer being arranged with their larger dimension extending radially, and the members in said outer layer being arranged with their larger dimension extending circumferentially, whereby said two layers are substantially torque balanced.

3,973,386

PROCESS FOR TEXTURING POLYESTER YARN

Adly Abdel-moniem Gorrafa, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

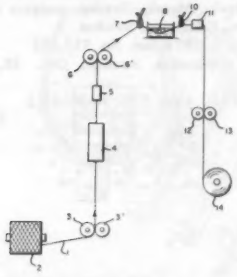
Filed Aug. 14, 1974, Ser. No. 497,489

Int. Cl.² D02G *1/02*; B02G *1/20*

U.S. Cl. 57—157 TS **5 Claims**

1. In the process for producing textured polyester yarn wherein synthetic linear ethylene terephthalate polymer is meltspun into filaments at 3000 to 5000 yards per minute to form a yarn characterized by a break elongation of 70 to 180 percent, by a birefringence value of at least 0.025, and by polyester which is less than 30 percent crystalline and has a relative viscosity of at least 18, and the yarn is drawn and textured in a draw-twist zone of a false-twist texturing ma-

chine with a heater temperature of at least 180°C; the improvement which comprises draw-texturing the yarn at 1.3 to 2.0 draw ratio and 20 to 70 turns per inch twist in said draw-twist zone, feeding the yarn from the drawtwist zone to an air jet at 8 to 35 percent overfeed without additional heating, jet-texturing the yarn with the air jet to form crunodal surface loops in the yarn, and packaging the resulting textured yarn at a package speed (P) greater than the takeup speed (T) from the air jet, the value of



$$\left(\frac{T-P}{T}\right)(100)$$

being from −1 to −10 percent.

3,973,387

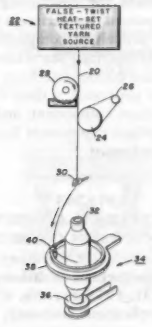
LOW DELIVERY TENSION PROCESS FOR PRODUCING CRIMPED YARN

Harold M. Familant, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 461,064, April 15, 1974, abandoned. This application Mar. 14, 1975, Ser. No. 556,231

Int. Cl.² D01H *1/20, 1/02*

U.S. Cl. 57—157 R **20 Claims**



1. In a continuous process wherein a thermoplastic yarn of between 10 and 100 denier is textured by false-twist heat-setting, the yarn then being fed at a given speed to a ring-and-traveller take-up mechanism comprising a spindle rotatably supporting and driving a pirn on which said yarn is to be collected, the improvement comprising rotating said spindle at a rate to maintain the balloon tension between 0.03 and 0.7 grams force.

3,973,388

LIQUID CRYSTAL DISPLAY CELL

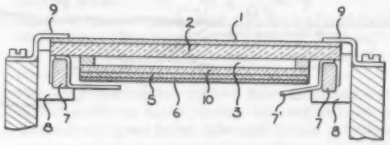
Masateru Yoshida, Tanashi, and Minoru Natori, Saitama, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1975, Ser. No. 557,613

Claims priority, application Japan, Mar. 18, 1974, 49-31072

Int. Cl.² G04B *19/30;* **C09K** *3/34*

U.S. Cl. 58—50 R **8 Claims**



1. An electro-optical watch display cell having an electro-optic material selected from the group consisting of the liquid crystal, electrochromic, and other electro-optical types, said cell having an upper glass substrate and a lower glass substrate, said upper and lower glass substrates sandwiching said electro-optical material thereinbetween, said glass substrates arranged and configured such that said upper substrate supports said electro-optical display cell in said watch, and wherein said lower glass substrate is sufficiently thin so as to substantially reduce the formation of undesired shadow images.

3,973,389

SOUND DEADENED CHAIN

Alfred M. Roberts, York, Pa., assignor to Campbell Chain Company, York, Pa.

Filed Aug. 11, 1975, Ser. No. 603,295

Int. Cl.² B21L *11/00;* **F16G** *13/16*

U.S. Cl. 59—35 R **8 Claims**

1. Sound deadened chain comprising a series of generally C-shaped metal links, with the stock diameter of each such link being sufficiently greater than the distance between its ends at the gap therein to preclude disconnection through the latter of any other such link coupled thereto, and a length of sound absorbing flexible non-metallic material extending in threaded fashion longitudinally through the series of links, the cross-sectional size of said length of resilient material being substantially the same as the gap distance, whereby the sound absorbing material length can be combined with the chain by lateral insertion of alternating loops of the same through the gaps of the successive links of the chain.

3,973,390

COMBUSTOR EMPLOYING SERIALLY STAGED PILOT COMBUSTION, FUEL VAPORIZATION, AND PRIMARY COMBUSTION ZONES

Ronald A. Jeroszko, Hebron, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 18, 1974, Ser. No. 533,921

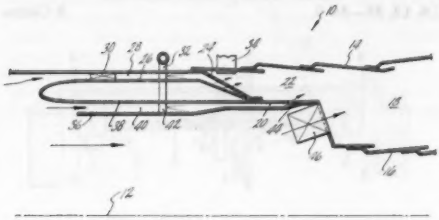
Int. Cl.² F02C *3/22;* **F02M** *23/00*

U.S. Cl. 60—39.06 **16 Claims**

1. The method of producing low emission combustion comprising the steps of:

A. establishing pilot combustion in annular form about an axis so that the products of combustion thereof are swirling about the axis,

B. introducing a uniform pattern of main combustion premixed, fuel rich-air mixture having an equivalence ratio of about 3 or higher into the swirling pilot products of combustion for fuel flash vaporization therein and for the



formation therewith of a swirling, fuel-rich mixture of vaporized fuel and air having an oxygen content too low for autoignition and combustion, and

C. introducing swirling main combustion air into the swirling vaporized fuel-air mixture to quickly mix therewith and raise the oxygen content thereof sufficiently to produce autoignition and rapid diffusion burning therewith.

3,973,391

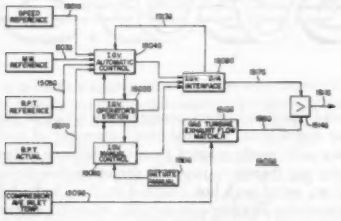
CONTROL APPARATUS FOR MODULATING THE INLET GUIDE VANES OF A GAS TURBINE EMPLOYED IN A COMBINED CYCLE ELECTRIC POWER GENERATING PLANT AS A FUNCTION OF LOAD OR INLET BLADE PATH TEMPERATURE

Terry J. Reed, North Huntingdon, and Jack R. Smith, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,727

Int. Cl.² F02C *9/14*

U.S. Cl. 60—39.29 **42 Claims**



1. In association with a combined cycle electric power plant including at least one gas turbine having a variable inlet guide vane assembly and actuating means therefor, and control means for regulating overall plant operation wherein signals representative of predetermined turbine parameters are generated, control apparatus for automatically modulating the position of the inlet guide vane assembly, said apparatus comprising:

a. first signal characterizing means, responsively coupled to the plant control means, for generating a first characterized inlet guide vane positioning signal in accordance with a predetermined correspondence between values of a first turbine parameter signal and positions of the inlet guide vane assembly;

b. second signal characterizing means, responsively coupled to the plant control means, for generating a second characterized inlet guide vane positioning signal in accordance with a predetermined correspondence between values of a second turbine parameter signal and positions of the inlet guide vane assembly; and

c. signal selection means, coupled between said first and second signal characterizing means and the inlet guide vane assembly actuating means, for selecting in accordance with a predetermined criteria one of said first and second characterized inlet guide vane assembly positioning signals to the inlet guide vane assembly actuating means.

3,973,392

PRESSURE PROPELLANT GENERATING SYSTEM

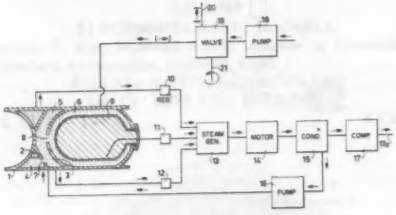
Ernst Bernhard Hallqvist, Motala, Sweden, assignor to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Oct. 9, 1974, Ser. No. 513,385

Claims priority, application Sweden, Oct. 10, 1973, 7313788

Int. Cl.² F02C *3/00, 7/14*; B63G *8/12*

U.S. Cl. 60—39.48 **4 Claims**



1. A pressure propellant generating system for a power plant in an underwater vehicle comprising, in combination, a propulsion motor, a steam generator for supplying a propellant to said motor, a first compartment containing a first propellant component, means for conducting said first propellant component to said steam generator, a second compartment communicating with said first compartment, first pump means for supplying pressurized water from the sea to said first compartment to expel said first propellant component from said first compartment to said steam generator through said conducting means, means for condensing the waste propellant gases discharged from said motor to form a condensate, second pump means for conducting said condensate under pressure to said second compartment to supplement the expulsion of said first propellant component from said first compartment by said pressurized sea water, means for conducting a quantity of said condensate from said second compartment to said steam generator, a third compartment containing a second propellant component, and means for delivering said second propellant component from said third component to said steam generator.

3,973,393

RECIPROCATING INTERNAL COMBUSTION ENGINE WITH CONTINUOUS COMBUSTION

Gustav Vogelsang, Braunschweig, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed May 31, 1974, Ser. No. 475,295

Claims priority, application Germany, June 22, 1973, 2331706

Int. Cl.² F02C *3/00*

U.S. Cl. 60—39.63 **20 Claims**

1. A reciprocating internal combustion engine with continuous combusting, said engine comprising, in combination:

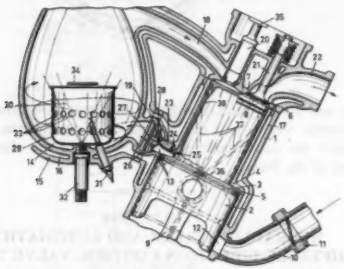
a cylinder;

a piston slidable in said cylinder and having an upper dead center and having a stepwise construction, said piston having a first annular face means defining a compression space operable for sucking in and compressing an air

volume and having a second face means defining an expansion space operable for expanding and pushing out an exhaust gas volume;

a combustion chamber defined in said engine, said combustion chamber including pump means operable for adding fuel to said compressed air volume to produce an ignitable fuel-air-mixture and igniting means operable for igniting said fuel-air-mixture and for maintaining a continuously burning flame;

a first transfer conduit means for conveying said compressed air volume to said combustion chamber; and



a second transfer conduit means for conveying said exhaust gas volume from said combustion chamber to said expansion space;

the above comprising means whereby within the range of the upper dead center of said piston, said compressed air volume is conveyed from said compression space by said first transfer conduit to said combustion chamber and at substantially the same time said exhaust gas volume of equivalent size is supplied from said combustion chamber by said second transfer conduit to said expansion space.

3,973,394

COMBUSTION ENGINE WITH REDUCED EMISSIONS

Mario Girodin, 20 Place de la Madeleine, 75008 Paris, France

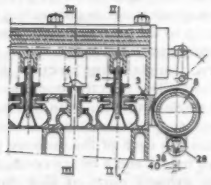
Continuation of Ser. No. 339,834, March 9, 1973, Pat. No. 3,877,220. This application Feb. 6, 1975, Ser. No. 547,558

Claims priority, application France, Mar. 10, 1973, 73.08573

The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.

Int. Cl.² F02G *3/02*

U.S. Cl. 60—39.63 **8 Claims**



1. An external combustion engine comprising

cylinder means, said cylinder means comprising a plurality of individual cylinders each having a piston and exhaust means associated therewith;

a common combustion chamber, said combustion chamber being provided with fuel injection means and including internal means for causing a pressure drop of air delivered thereto to maintain substantially constant mean pressure therein while gas is intermittently delivered thereto and exhaust products are intermittently withdrawn therefrom;

intake valve means associated with each of said cylinders, said intake valve means each including a controlled valve having a valve member and an actuator therefor located externally of the associated cylinder;

means coupling said combustion chamber to all of said cylinders via said intake valve means whereby air compressed in each of said cylinders may be delivered to said combustion chamber upstream of said pressure drop causing means;

exhaust valve means associated with each of said cylinders, said exhaust valve means each including a valve member and an actuator therefor located externally of the associated cylinder;

means for delivering hot exhaust gases from said combustion chamber to said cylinders via said exhaust valves, said exhaust gases being delivered to said cylinders at a pressure which approximates the compressed air delivery pressure; and

means for delivering a coolant for circulation through said exhaust valve means valve members.

3,973,395

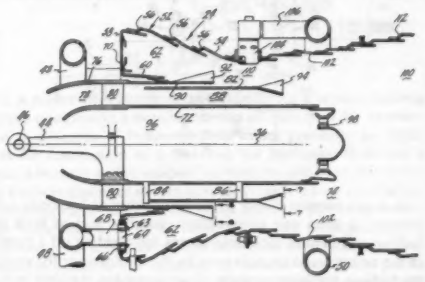
LOW EMISSION COMBUSTION CHAMBER

Stanley J. Markowski, East Hartford, and James J. Nolan, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 18, 1974, Ser. No. 533,922

Int. Cl.² F02C *7/22*; **F02M** *23/00*

U.S. Cl. 60—39.65 **5 Claims**



1. A low NOx combustion chamber having an axis and comprising:

A. means to produce pilot combustion swirling about said axis and similarly swirling hot, fully combusted, pilot exhaust gases of reduced oxygen content and of a temperature above the vaporization temperature of the fuel to be utilized in the combustion chamber,

B. means to inject atomized fuel into the swirling pilot products of combustion in selected quantity to produce a first swirling mixture of fuel and air of reduced oxygen content so that the first swirling mixture has a first ignition delay time to prevent autoignition of the atomized fuel droplets, said first swirling mixture also having a selected temperature to vaporize the fuel so that said first swirling mixture is a vaporized, swirling fuel-air mixture having a reduced oxygen content to produce autoignition at the culmination of the first time delay, and

C. means to mix a selected quantity of swirling combustion air with the first swirling mixture to effect molecular mixing between the fuel and air since both the first mixture and combustion air are swirling, and in selected quantity to produce a second swirling, vaporized fuel-air mixture of oxygen level greater than that of said first mixture to effect a new and reduced ignition delay time so as to autoignite the second mixture at an ER less than one and at a time sooner than the expiration of the first

ignition delay time to thereby reduce the dwell time of the engine air at NOx creating temperature,

D. wherein said combustion chamber has a pilot combustion chamber axially upstream of a main combustion chamber and wherein the first and second mixtures swirl concentrically about the axis,

E. wherein said pilot combustion chamber includes:

1. a forward wall, and

2. means operatively associated with the forward wall to cause pilot combustion and pilot products of combustion to swirl about the axis, and

F. wherein said swirl causing means in said pilot combustion chamber are a plurality of circumferentially disposed and spaced, and axially extending fuel nozzles extending through the forward wall, a swirl vane ring enveloping each fuel nozzle and supporting the fuel nozzle axially within the wall, a plurality of combustion air passages extending through the forward wall between adjacent vane rings and directed at an angle with respect to the combustion chamber axis so that the pilot combustion will occur and pilot products of combustion will flow in swirling fashion about the combustion chamber axis.

3,973,396

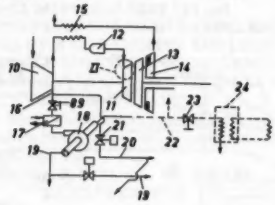
GAS TURBINE POWER PLANT

Sven-Olof Kronogård, Lomma, Sweden, assignor to United Turbine AB & Co., Kommanditbolag, Malmo, Sweden

Filed Oct. 16, 1974, Ser. No. 515,174

Int. Cl.[2] F02C *7/08, 7/18;* **F25B** *9/02*

U.S. Cl. 60—39.66 **4 Claims**



1. A gas turbine power plant comprising at least one compressor, at least one combustion chamber and at least one turbine and further including means for dividing off a portion of the compressed air delivered by the compressor for cooling the turbine, the improvement of an expansion member including means arranged to divide a supply fluid into a hot fraction and a cold fraction, means for conveying said divided-off portion of compressed air to said expansion member, further means for conveying at least part of said cold fraction to the inlet means of the said at least one turbine, means for conveying a further portion of the air delivered by the compressor directly to the inlet means of the turbine; and means for mixing this further portion of air with the cold fraction conveyed to the turbine inlet means.

3,973,397

ROCKET MOTOR WITH ABLATIVE INSULATING CASING LINER

Michael John Chase, Kidderminster; Derek Anthony Smith, London, both of England, and Michael Alan Dudley, Beaconsfield, Canada, assignors to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

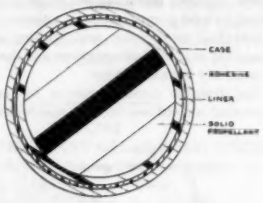
Division of Ser. No. 280,162, Aug. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 730,950, May 21, 1968, abandoned. This application Jan. 17, 1974, Ser. No. 434,305

Claims priority, application United Kingdom, May 23, 1967, 23987/67

Int. Cl.[2] F02K *9/04*

U.S. Cl. 60—253 **6 Claims**

1. A rocket motor cas having an insulating liner bonded to the inner surface of the case, said liner comprising a cured elastomer containing 75–100 parts of a terpolymer of ethylene, propylene and a non-conjugated diene, up to 25 parts of at least one other elastomer, 40 to 100 parts of an inert filler material selected from the group consisting of silica and asbestos and 20–80 parts of ablative filler materials other than lead chloride which will decompose at temperatures near to or above the decomposition temperature of the elastomer content of the liner.



3,973,398

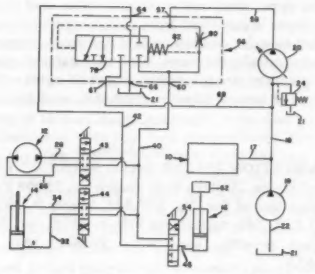
HYDRAULIC SYSTEM AND AUTOMATICALLY SHIFTABLE DIRECTION CONTROL VALVE THEREFOR

Carl Edwin Kittle, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 12, 1975, Ser. No. 612,632

Int. Cl.[2] F15B *11/16*

U.S. Cl. 60—427 **9 Claims**

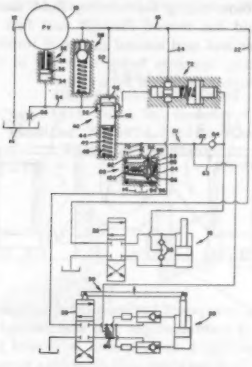


1. In a tractor hydraulic system including a reservoir, a charging pump supplied by the reservoir, a priority function such as that for cooling or lubricating the tractor transmission, a main pump, conduit means connecting the outlet side of said charging pump to the priority function and to the inlet side of the main pump, at least one function having pressure and exhaust ports, a single-acting function, direction control valve means for controlling selective operation of said one function and of said single-acting function and including pressure and exhaust ports, supply conduit means connecting the outlet of the main pump to each of the pressure ports of the direction control valve means and a return conduit means connected to each of the exhaust ports of said direction control valve means, the improvement comprising: valve means operatively connected in said supply and return conduit means and to said conduit means and including valve member means being shiftable, in response to the single-acting function being exhausted, to a first operative position wherein fluid flow is permitted through the return conduit means to the reservoir and being shiftable, in response to the one function being operated, to a second operative position wherein fluid flow in the return conduit is permitted through said valve means to said conduit means.

3,973,399
DEMAND COMPENSATED HYDRAULIC SYSTEM WITH PILOT LINE DITHER

Harlan Welbert Van Gerpen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Dec. 29, 1975, Ser. No. 644,883
Int. Cl.² F16H *39/46*
U.S. Cl. 60—445 **6 Claims**

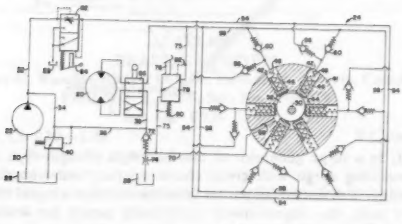


1. An improved hydraulic system of the type having a variable displacement pump with output control means biased to increase pump output and responsive to an input of pressurized fluid to decrease pump output, a fluid motor, an output line connected between the pump and the motor, a motor control valve interposed in the output line and having servo feedback from the motor for selectively opening and closing the output line, a control line connected between the pump and the output control means, demand valve means interposed in the control line for selectively opening and closing the control line to allow and block the input of pressurized fluid to the output control means in response to pressurized fluid in a pilot line connected to the demand valve means, said pilot line further connected to the output line between the motor control valve and the motor, wherein the improvement comprises: means operatively associated with the pilot line responsive to pressurized fluid therein to cause fluctuations in the pressure of the pressurized fluid.

3,973,400
HYDROSTATIC TRANSMISSION

Donald Dean Petersen, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 4, 1975, Ser. No. 610,233
Int. Cl.² F15B *15/18*
U.S. Cl. 60—465 **7 Claims**

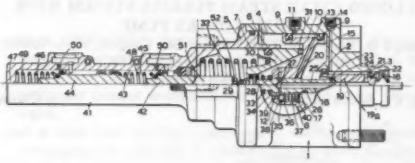


1. In a hydrostatic transmission including a pump having a plurality of reciprocating pistons projecting into a drive chamber, a supply of fluid for the pump, means for controlling the displacement of the pump by controlling the fluid flowing to the pump, a hydraulic motor, and hydraulic circuit means interconnecting the pump and motor and including means for controlling the direction of fluid flow through the motor, a combined inching and safety circuit comprising: fluid line means interconnecting the pump outlet and the drive chamber; valve means interposed in the fluid line means normally biased to a closed position and responsive to a predetermined fluid pressure at the pump output to open; and manually operable means associated with the valve means to overcome the bias and open the valve means.

3,973,401
POWER-OPERATED BOOSTERS FOR VEHICLE BRAKING SYSTEMS

Desmond Henry James Reynolds, Sutton Coldfield, and Alfred Yardley, Blakedown, both of England, assignors to Girling Limited, Birmingham, England

Filed Jan. 30, 1975, Ser. No. 545,348
Claims priority, application United Kingdom, Jan. 30, 1974, 4302/74; May 21, 1974, 22514/74
Int. Cl.² F15B *7/00*
U.S. Cl. 60—548 **14 Claims**



1. A power-operated hydraulic booster for a vehicle braking system comprising a housing having an inlet port for connection to a source of hydraulic fluid under pressure, an outlet port for connection to a reservoir for hydraulic fluid and a bore, a booster piston adapted to work in said bore and defining a power chamber in said bore, and valve means controlling communication between said ports and said power chamber, said valve means being so constructed and arranged that in response to an input force hydraulic fluid from said inlet port pressurises said power chamber to advance said boost piston in said housing thereby augmenting said input force, and said valve means comprises a spool working in complementary bores in said boost piston and an adjacent end of said housing, said spool comprising an assembly of at least two separate freely separable uncoupled spool parts having adjacent ends in abutment and provided with passage means which communicate at said adjacent ends, and sealing means are disposed between said adjacent ends to seal said passage means from said bores at least at said adjacent ends, one of said spool parts working in said bore in said boost piston and the other of said spool parts working in said bore in said housing.

3,973,402
CYCLE IMPROVEMENT FOR NUCLEAR STEAM POWER PLANT

George J. Silvestri, Jr., Morton, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1974, Ser. No. 437,591
Int. Cl.² F01K *7/34*
U.S. Cl. 60—678 **3 Claims**

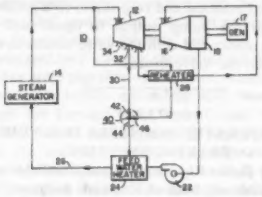
1. A steam turbine power plant comprising:

a closed-loop turbine arrangement having at least a steam generator element connected in series to a high pressure turbine element, a low pressure turbine element and a condenser element, said high pressure turbine element having an extraction zone, an inlet and an exhaust each separate from the other therein;

a feedwater heater connected between said condenser element and said steam generator element;

extraction means for extracting steam from said extraction zone to said feedwater heater;

a source of fluid having a pressure therein higher than the pressure at the extraction zone of said high pressure turbine element; and,



means for increasing the pressure of the steam extracted from said high pressure turbine, said pressure increasing means being activated by fluid from said fluid source, said pressure-increasing means being connected within said extraction means.

3,973,403

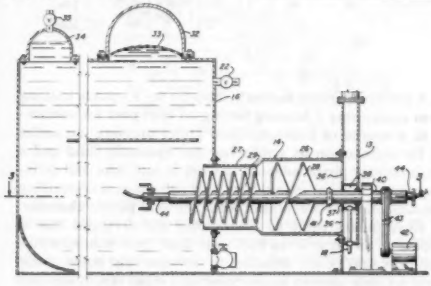
CLOSED CYCLE STEAM TURBINE SYSTEM WITH LIQUID VORTEX PUMP

Kenard D. Brown, 1227 S. Willow St., Casper, Wyo. 82601

Filed Aug. 12, 1974, Ser. No. 496,815

Int. Cl.² F01K *19/00*

U.S. Cl. 60—688 **6 Claims**



1. A closed cycle steam turbine system comprising:

a. a steam generating boiler;

b. a steam turbine connected to receive steam from said boiler;

c. a vacuum pump of the liquid vortex type including a tank for holding a body of water and connected to receive exhaust steam from said turbine and to condense such steam and mix it with said body of water; and,

d. means for returning water from said pump to said boiler.

3,973,404

LOW PRESSURE TURBINE INSTALLATION

Nobuyuki Iizuka; Katsukuni Hisano; Satoshi Ninomiya, and Yasuhiko Otawara, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 21, 1975, Ser. No. 542,820

Claims priority, application Japan, Jan. 23, 1974, 49-9323

Int. Cl.² F01K *11/02*

U.S. Cl. 60—693 **5 Claims**

1. A low pressure turbine installation comprising:

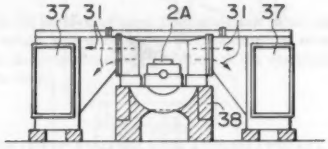
a low pressure turbine casing;

a first group of turbine stages consisting of a plurality of stages mounted on a rotary shaft in said low pressure casing and disposed such that a stream of fluid flows from the high pressure side to the low pressure side;

a second group of turbine stages consisting of a plurality of stages also mounted in said low pressure turbine casing on said rotary shaft, said second group of turbine stages being disposed such that another stream of fluid branching from said stream of fluid flows from the high pressure side to the low pressure side so that the two streams of fluid flow countercurrently to each other;

condensers arranged on opposite sides of said low pressure turbine casing such that the condensers have substantially the same height as the low pressure turbine casing;

exhausting openings opening at opposite sides of said low pressure turbine casing for venting fluid therethrough after the fluid has moved through said first group of turbine stages and said second group of turbine stages, said exhausting openings being disposed in a position equal to or higher than said rotary shaft;



a partition wall interposed between the final stages of said first group of turbine stages and said second group of turbine stages which are disposed in spaced juxtaposed relationship, said partition wall extending normal to said rotary shaft and toward the exhausting openings so that said partition wall is effective to prevent the collision of the countercurrents of fluid which have moved through the first group of turbine stages and the second group of turbine stages and to conduct the fluid toward the exhaust openings; and an exhaust passage formed between said partition wall and said low pressure turbine casing for the fluid to move therethrough toward the exhaust openings after the fluid has moved through said two groups of turbine stages.

3,973,405

SURGE GENERATORS OF THE PLUNGER TYPE

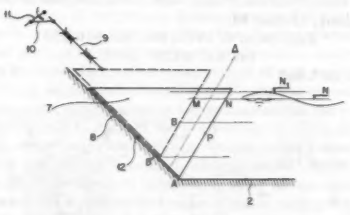
Jacques Duport, St Ismier, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris, France

Filed Oct. 30, 1975, Ser. No. 627,407

Claims priority, application France, Nov. 20, 1974, 74.38166

Int. Cl.² E02B *3/00;* **A47K** *3/10*

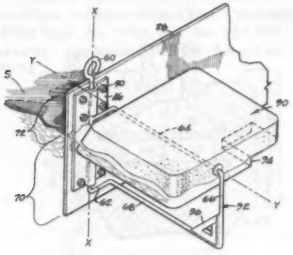
U.S. Cl. 61—1 R **1 Claim**



1. In a surge generator of the fluid-tight plunger type, for generating surge with given characteristics, and wherein a plunger is mounted for partial immersion within a liquid filled test tank, the improvement comprising means for limiting plunger movement through an angle in relation to the vertical position imparted to the plunger between about 15° and 70°, and wherein the direction of inclination is such that the low

part of the path of the plunger is in front of the top part of that path, in relation to the direction of propagation of the surge emitted, said plunger is always partly immersed and takes the shape of a prism with horizontal generating lines perpendicular to the surge to be generated, the clearance between the lateral walls of the plunger and the corresponding walls of the test tank being slight, and wherein the inclined movement of the plunger is obtained by sliding of the rear face of the plunger on an inclinded plane with a continuous wall and the direction of the inclination of said plane being such that the lowest generating line is in front of the highest generating line in relation to the direction of propagation of the surge emitted.

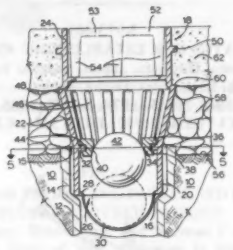
3,973,406
CONTAINMENT BOOM
Gerald J. Casey, 1819 Curtis St., Berkeley, Calif. 94702
Filed Dec. 26, 1974, Ser. No. 536,348
Int. Cl.² E02B *3/00*
U.S. Cl. 61—1 F **9 Claims**



1. A floating barrier of the kind used on bodies of water to prevent and control pollution caused by materials such as oil spills and other floating debris, said barrier comprising,
an elongated flexible belt, and
a plurality of outrigger support means connected to one side of the belt at spaced apart locations along the length of the belt to hold the belt upright in the water along one edge of the belt while permitting free flexing of the belt between the support means,
each outrigger support means including a frame and a float connected to the frame, and
wherein the side of the belt opposite that supported by the outrigger support means has a substantially smooth surface for the engagement with the material to be contained by the barrier,
and wherein each outrigger support means includes a pivotal connection between the frame and the belt,
and including a pivotal connection between the float and the frame, and wherein the frame is mounted for pivoting movement about a vertical axis and the float is mounted for pivoting movement about a horizontal axis.

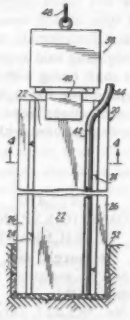
3,973,407
DRAINAGE SYSTEM
Fiore M. Vecchio, 8301-118 Ave., Edmonton, Alberta, Canada
Filed May 2, 1975, Ser. No. 573,958
Int. Cl.² E03F *1/00*
U.S. Cl. 210—136 **9 Claims**

1. A floor drain comprising:
a body portion,
first aperture means opening upwardly from the body portion,
second aperture means opening substantially laterally from the body portion at a location below said first aperture means,
a downwardly open throat portion below said second aperture means and providing a drainage opening,
partition means in said body portion dividing said portion internally into (a) a central compartment having a bottom opening within said throat portion and communicating only with said first aperture means, and (b) an annular compartment surrounding said central compartment and communicating only with said second aperture means, said annular compartment having means defining a lower outlet adjacent the bottom opening of said central compartment,



a main check-valve in said bottom opening for allowing downward but restraining upward passage of liquid, the said lower outlet of said annular compartment opening into said central compartment above said main check-valve,
and at least one auxiliary check-valve within said annular compartment, adapted to allow liquid to move from the second aperture means to said lower outlet, and to restrain liquid movement in the reverse direction.

3,973,408
CONSTRUCTION OF UNDERGROUND DAMS AND EQUIPMENT THEREFOR
Grisha H. Paverman, 200 E. 64th St., New York, N.Y. 10021
Filed Apr. 7, 1975, Ser. No. 565,682
Int. Cl.² E02D *5/20, 7/18*
U.S. Cl. 61—35 **5 Claims**



1. A method of constructing a fluid impervious subterranean wall which comprises vertically sinking a web member into the ground by applying to the web member a vertically vibratory force, then extracting the web member from the ground while applying a vertically vibratory force thereto, concurrently injecting under pressure into the ground beneath the lower edge of the web member as it is sunk and extracted a liquid settable grout, the vibratory sinking and extraction of the web member loosening the soil surrounding the space occupied by the web member as it is sunk and extracted, and

the grout filling the space left by the web member as it is being extracted and also during sinking and extraction filling voids vibratorily developed in the ground surrounding such space so as to substantially transversely enlarge the grout-filled volume at and around the vibratorily sunk and withdrawn web member beyond the aforesaid space, and thereafter successively sinking and extracting said web member in the ground alongside the grout-filled space left by the preceeding sunk and extracted web member, and in overlapping relationship thereto, and while injecting grout under pressure beneath the lower edge of the web member, before the grout in the previously grout-filled space has set.

3,973,409

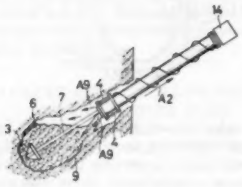
APPARATUS FOR ESTABLISHING AN ANCHOR

Kingo Asayama, Hirakata, Japan, assignor to Kabushiki Kaisha Takechi Koumusho, Osaka, Japan

Filed July 5, 1974, Ser. No. 485,777

Int. Cl.[2] E21D *20/02*; **E02D** *5/74*; **E21B** *9/30*

U.S. Cl. 61—39 **3 Claims**



1. An apparatus for establishing an anchor inside a retaining wall from the outside thereof, said apparatus comprising: a hollow auger shaft and centrifugally expansible blades mounted at the lead end of said auger shaft, pivot means on said shaft hingedly connecting said blades to said auger shaft whereby said blades can assume a retracted position seated against said auger shaft when said auger shaft is rotated in one direction and said blades can assume an extended, generally radial position when said auger shaft is rotated in the opposite direction; an auger head projecting from said lead end of said auger shaft, said auger head having a ground boring lead and adapted to penetrate soil when rotated in either direction; positive interference type clutch means securing said auger head to said auger shaft for rotation therewith in both directions, said clutch disengaging said auger shaft from said auger head upon said auger shaft being withdrawn axially from said auger head; a rod extending through said auger shaft and threadedly engaging said auger head, said rod holding said auger head in positive engagement with said clutch means and said auger shaft.

3,973,410

DISC-TYPE AUTOMATIC EXPANSION VALVE FOR REFRIGERANT

Thomas H. Putman, Pittsburgh, and Francis T. Thompson, Murrysville, both of Pa., assignors to White-Westinghouse Corporation, Cleveland, Ohio

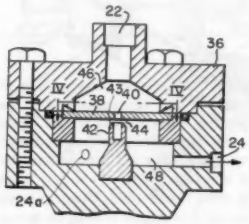
Continuation of Ser. No. 383,427, July 27, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,479

Int. Cl.[2] F25B *41/06*

U.S. Cl. 62—527 **7 Claims**

1. A refrigerant expansion valve of the type in which a differential pressure across an expansion orifice is used to control the refrigerant flow area of the orifice, comprising: a hollow valve body having refrigerant inlet means and refrigerant outlet means; a disc-shaped deflectable member supported at its periphery from said valve body and separating the interior of said valve body into an upstream space and a downstream space, said deflectable member including means defining generally centered aperture means in said member; stationary structure supported from said valve body and extending into relatively close spacing with said means defining said aperture means to define a refrigerant expansion orifice therewith so that the upstream face of said deflectable member is subject to the pressure of liquid refrigerant in the upstream space, and the downstream face of said deflectable member is subject to the pressure of expanded vapor refrigerant in said downstream space so the increases and decreases in the differential pressure between the upstream and downstream spaces in the range of pressure encountered in normal operation effect corresponding increases and decreases in deflection of said deflectable member to thereby decrease and increase the effective size of said expansion orifice; said deflectable member being of such configuration and so designed that average refrigerant flow rates will increase and decrease in accord with said increased and decreased pressure differentials.

2. A refrigerant expansion valve including: a valve body including a chamber and having inlet means thereto for receiving substantially liquid refrigerant from a condenser, and outlet means therefrom for discharging substantially expanded vaporous refrigerant to an evaporator; a disc-shaped deflectable member having a central aperture and located in said chamber between said inlet means and outlet means to separate said valve body into an upstream space and a downstream space; stationary structure in said chamber spaced relatively close to the part of said member defining said aperture to define, with said part, an annular refrigerant expansion orifice therebetween; the upstream space in said chamber confining said liquid refrigerant in its passage during service of said valve and subjecting the upstream face of said member to the pressure of said liquid refrigerant, and the downstream space in said chamber confining said expanded vaporous refrigerant in its passage during service of said valve and subjecting the downstream face of said member to the pressure of said expanded vaporous refrigerant, to obtain an increased and decreased deflection of said deflectable member, and correspondingly a decreased and increased effective opening of said orifice, in accordance with increased and decreased differential pressures of said liquid and expanded vaporous refrigerant in the range of pressures encounterd in normal operation; said deflectable member being of such configuration and so designed that average refrigerant flow rates will increase and decrease in accord with said increased and decreased pressure differentials.



3,973,411

COUPLING FOR FLEXIBLE SHAFT ELEMENT

Robert E. Stuemky, Elizabeth, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Oct. 28, 1975, Ser. No. 625,970

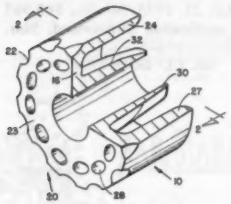
Int. Cl.[2] F16C *1/26*

U.S. Cl. 64—4 **16 Claims**

1. A coupling comprising:

a one-piece cup including a sleeve integrally interconnected

to a generally radial wall that defines a bottom portion of the cup, the sleeve having an exteriorly fluted edge juxtaposed the bottom portion and the radial wall having a plurality of circumferentially spaced apertures.



3,973,412

TORQUE-LIMITING COUPLINGS

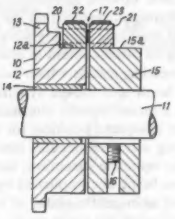
Howard Price Miles, 1, Glan-y-Nant Close, Cwmbran, England

Filed Sept. 26, 1975, Ser. No. 617,089

Claims priority, application United Kingdom, Sept. 27, 1974, 42059/74

Int. Cl.² F16D 3/58

U.S. Cl. 64—28 R 12 Claims



1. A torque-limiting coupling comprising two co-axial rotary members and a connector unit connecting the two members together for rotation in unison, the connector unit comprising two blocks detachably secured one to each of the two rotary members and at least one shear pin firmly secured in aligned bores in the two blocks and offset from the rotational axis of the rotary members, whereby in the event of the pin or pins being sheared by transmission of torque above a predetermined limiting value, the broken connector unit may be removed from the coupling and replaced by another connector unit without disturbing the rotary members.

3,973,413

PORTABLE HAND KNITTING DEVICE

George Humphrey Tichenor, 545 Sutter St., San Francisco, Calif. 94108

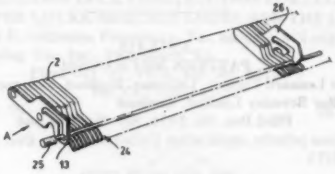
Continuation-in-part of Ser. No. 356,124, May 1, 1973, Pat. No. 3,868,834. This application Sept. 19, 1974, Ser. No. 507,554

Claims priority, application United Kingdom, Jan. 3, 1974, 235/74

Int. Cl.² D04B 3/00

U.S. Cl. 66—1 A 6 Claims

1. A knitting device comprising a needle bed, a plurality of equidistantly spaced substantially parallel barbed needles in said needle bed, a depressor bar for closing the barbs of the needles in said needle bed, at least two depressor plates one depressor plate disposed at each end of said needle bed, a retaining notch in each depressor plate and a sinker whereby on rotation and movement of the sinker along said needle bed said sinker sequentially draws working yarn or material from between the needles and on completion of a row of stitches along said needle bed the barbs of said needles may be releasably closed by locating the depressor bar between said retaining notches so that said row of stitches may be passed to the bottom of said needles to form a row of stitches in a knitted article.



3,973,414

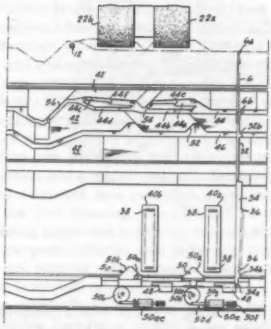
APPARATUS FOR PRODUCING PATTERNED DEEP PILE CIRCULAR KNITTED FABRICS

James D. Golladay, Wauwatosa, and Norman C. Abler, Menominee Falls, both of Wis., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed May 8, 1973, Ser. No. 358,398

Int. Cl.² D04B 9/14

U.S. Cl. 66—9 B 19 Claims



1. In a pile fabric circular knitting apparatus including a rotatable needle cylinder and reciprocatable knitting needles therein, supply means for delivering fibers to a plurality of feeding means providing zones spaced about the circumference of the cylinder wherein the fibers are picked up by certain of said knitting needles as they are selectively reciprocated into the respective zones, and yarn feed means for delivering backing yarn between certain of said zones to be picked up by the knitting needles actuated to receive said yarn, the combination which comprises:

means for selectively reciprocating the individual knitting needles into said zones to cause the needles to remove fibers from the zones for transfer to knitted fabric;

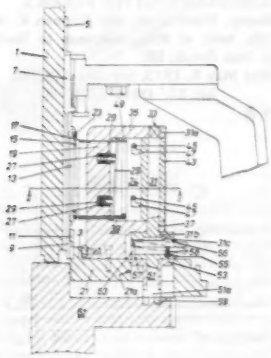
pattern means controlling said supply means to vary the amount of fibers supplied to the respective zones;

controllable means separate from said supply means selectively regulating the cooperative relationship of the needles with the zones to modify the quantity of fibers that said knitting needles will transfer from a respective one of said zones to the knitted fabric;

dynamic control means functioning while the apparatus is in continuous and uninterrupted operation, for actuating said controllable means, whereby to control the density of pile in the knitted fabric;

and means separate from said controllable means and said dynamic control means for reciprocating the needles to pick up yarn from said yarn feed means and integrate the fibers and the yarn into interlocking loops of the knitted fabric.

3,973,415
PATTERN MECHANISM
Ernest Leonard Farmer, Leicester, England, assignor to Wildt Mellor Bromley Limited, England
Filed Dec. 10, 1974, Ser. No. 531,384
Claims priority, application United Kingdom, Dec. 22, 1973, 59705/73
Int. Cl.² D04B 15/74
U.S. Cl. 66—50 B 9 Claims



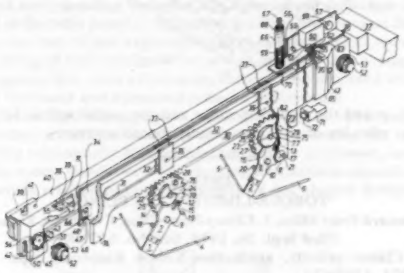
1. A circular knitting machine which comprises a cylinder with needles and a cam plate with a knitting station for acting on the needles, a drive means for providing relative rotation between the cylinder and cam plate one with respect to the other around a central cylinder axis;

a pivotable pattern key mounting, a shaft for the mounting located with respect to the cam plate, at least two pattern keys fitted on the mounting, patterning butts on the keys defining at least two rows of butts spaced angularly around the shaft, a lever associated with the mounting and pivotably conjointly with the mounting, and a cam follower on the lever;

at least two parallel tracks for engaging the cam follower, the tracks comprising each a circular portion concentric with the cylinder axis, extending around the cylinder for a substantial arc thereof, and preventing pivotal movement of the lever and mounting to locate one row of butts in an operative position controlling needle selection for the knitting station, and

means fixed angularly with respect to the cylinder for camming the cam follower from one track to another, said camming means being located between ends of the circular portions, and having cam faces inclined with respect to a radius from the cylinder axis to move the cam follower from one track to another and thereby pivot the lever and mounting to locate another row of butts in the operative position.

3,973,416
KNITTING MACHINE
Fritz Kohler, Couvet, Switzerland, assignor to Edouard Dubied et Cie (Societe Anonyme), Couvet, Switzerland
Filed Mar. 21, 1975, Ser. No. 560,967
Claims priority, application Switzerland, Mar. 27, 1974, 4261/74
Int. Cl.² D04B 7/04
U.S. Cl. 66—64 9 Claims

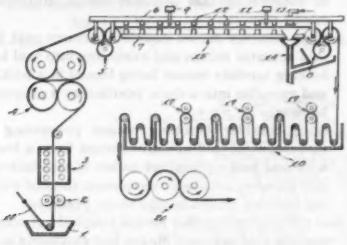


1. A knitting machine having at least two needlebeds arranged in roof form provided with needles which can cross each other during their upward movement, a carriage being displaced in an oscillating movement on the a kinematic parts and provided with at least one knitting system for the control of the needles during its displacement in alternating direction, at least one stitch pressing means which seats on the stitches held in the needle hook and moves synchronously with the needle control, and a means for the alternating control of the stitch press from an adequate position for the movement of said stitch press along a row of needles into another position for movement in the opposite direction, the alternating control of the stitch press being accomplished by a system of stops actuating a rack and akinematic chain of movement for the reversing of the position of the stitch press, wherein the chain of movement comprises the circular motion of a serrated wheel mounted on a shaft connected to the carriage and in disengagement with the rack, which motion is transformed into the movement of the stitch press from one position to the other through a lever attached to the stitch press and mounted on a shaft connected to the carriage which cooperates with raised portions of the serrated wheel, and wherein the lever has a groove at the end opposite the stitch press for cooperation with a lug projecting from the serrated wheel for the movement of the stitch press from one position to the other and has a pair of disengagement surfaces adjacent the groove for cooperation with a raised, curved bearing surface on the serrated wheel to prevent the movement of the stitch press except when the lug is in cooperation with the groove.

3,973,417
APPARATUS FOR THERMOSOL DYEING OF POLYESTER FABRICS
James E. Greer, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.
Division of Ser. No. 367,360, June 6, 1973, Pat. No. 3,895,909.
This application Dec. 16, 1974, Ser. No. 533,164
Int. Cl.² D06B 3/10
U.S. Cl. 68—19.1 4 Claims

3. Apparatus for dyeing polyester material comprising means for continuously feeding polyester material through means for dyeing the polyester material, predrying means for predrying the polyester material after the predrying material has passed through the dyeing means, thermosoling means for thermosoling the polyester material, first and second tensioning means for applying tension to the polyester material while the polyester material is fed through said thermosoling means,

said first tensioning means being positioned at the entrance of said thermosoling means and said second tensioning means being positioned at the exit of said thermosoling means such that said polyester material is out of contact with said first and



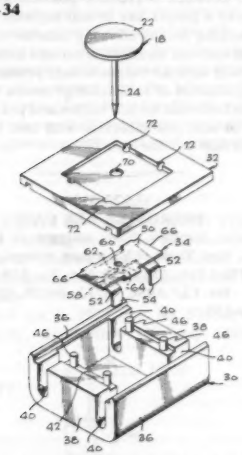
second tensioning means during thermosoling, quenching means positioned between the exit of said thermosoling means, and said second tensioning means, and means for after-treating the polyester material after the thermosoling.

3,973,418

REUSABLE DEVICE FOR ATTACHING AN ANTI-THEFT MONITOR TO MERCHANDISE

Leo R. Close, Granada Hills, Calif., assignor to Mrs. Lawrence Israel, Los Angeles, Calif.

Filed Mar. 31, 1975, Ser. No. 563,480
Int. Cl.[2] A44B *1/38;* **E05B** *67/36*
U.S. Cl. 70—34 **23 Claims**



1. A keeper adapted to form part of a releasable, reusable, tamper-proof attachment device for attaching an anti-theft monitor to an article of merchandise, the attachment device being of the type including a tack having a shank adapted to extend through both the monitor and the article and into the keeper, said keeper comprising:

a housing having end walls and a cover, at least one of the walls defining means a pair of spaced apart apertures for receiving releasing means insertable into said housing, the cover having an opening for receiving the shank of the tack; and

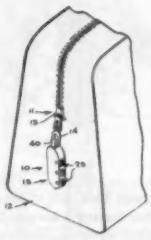
a one-way, releasable fastener mounted inside the housing for receiving and gripping the shank of the tack, the fastener being adapted to increasingly grip the shank in response to increasing withdrawal forces applied to the tack, the fastener including release control surfaces positioned to be displaced by the releasing means, displacement of the release control surfaces in a direction generally perpendicular to the tack shank direction effecting release of the tack shank.

3,973,419

COMBINATION LOCK CONSTRUCTION FOR LUGGAGE ZIPPER LOCKS, SHACKLE LOCKS AND THE LIKE

Wallace E. Atkinson, Petersburg, Va., assignor to Long Manufacturing Co., Inc., Petersburg, Va.

Filed Oct. 31, 1975, Ser. No. 627,877
Int. Cl.[2] E05B *67/38*
U.S. Cl. 70—68 **16 Claims**



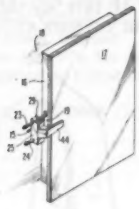
1. A combination lock assembly for securing a closure member and the like, comprising an elongated lock housing extending along a reference plane and having front and rear wall members and opposite end walls defining a mechanism chamber therebetween, a combination lock mechanism housed in said mechanism chamber including an elongated bolt plate member adjacent said rear wall and an elongated fence plate and a plurality of dial assemblies located generally in three planes paralleling said reference plane progressing forwardly from said rear wall member, the bolt plate member having a locking formation at one end thereof and being supported for reciprocative movement longitudinally along a rectilinear first axis paralleling said reference plane between a locked position and a release position disposing said locking formation in retracted and extended positions respectively relative to the lock housing, the plurality of rotatable dial assemblies being supported in side by side relation for rotation about axes perpendicular to said reference plane and each comprising an annular wheel member supported inwardly adjacent the front wall of said housing having a portion projecting to an externally exposed position for manipulation to angular positions forming a selected dial combination and each including a hub member coupled with the wheel member for rotation with the latter, said fence plate being located between said bolt plate and said dial assemblies supported for translatory movement in a plane paralleling said reference plane along an axis normal to said first axis, said fence plate and dial wheel hub members having coactive shaped surfaces for restraining the fence plate at a locking position when the dial wheel members are displaced from the selected combination and shaped to accommodate translatory movement of the fence plate perpendicular to said first axis to release position when the dial wheel members occupy said selected combination, spring means bearing against said fence plate for continuously resiliently biasing the same to said release position, said bolt plate member having rigid forwardly projecting locking lug formations thereon projecting through the plane of said fence plate, and said fence plate having recess means defining shoulder surfaces positioned to restrain the bolt plate against movement from its locking position when the fence plate is in locking position and having recess portions laterally alined with said locking lug formations along the direction of said first axis to be positioned to receive the associated locking lug when said fence plate assumes said release position and accommodate relative movement of the associated locking lug into the recess portions and permit movement of the bolt plate member to said release position.

3,973,420

LOCK FOR MEDICINE CABINETS AND THE LIKE

Steven F. Brady, 8735 Contee Road, Laurel, Md. 20810, and James Patrick Edelmann, 10439 Naglee Road, Silver Spring, Md. 20903

Filed May 16, 1975, Ser. No. 578,182
Int. Cl.[2] E05B 65/44
U.S. Cl. 70—78 16 Claims



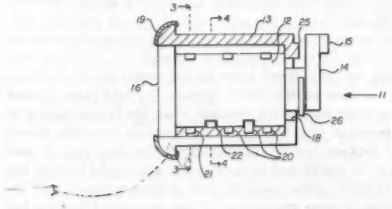
1. An attachment lock for cabinet closures comprising a lock body member having a longitudinal guide passage therethrough and a relatively movable locking bar member extending through said guide passage, one of which terminates in a flat mounting surface portion on one end thereof adapted for securement to the outer face of a cabinet side wall which is rearwardly of and at substantially right angles to a cabinet closure to be locked against forward movement relative to the side wall, the other of which quidably slides longitudinally parallel relative to the other between a locking position and a release position, said flat mounting surface portion positioned at substantially right angles to the plane of movement of the other said member and substantially aligned with the direction of movement of the cabinet closure, means for fixedly connecting said flat mounting surface portion to the outer face of the cabinet side wall, and a closure positive locking member carried bodily by one or the other of said lock body member or locking bar member and lying in a plane parallel to the locking bar member and spaced laterally therefrom, said closure positive locking member adapted to assume a locking position relative to said closure when the lock body member and locking bar member are slidably moved relatively in one longitudinal direction and adapted to assume a retracted closure release position when the lock body member and locking bar member are slidably moved relatively in an opposite longitudinal direction, and a one way free moving one way positively engaging lock mechansim on the lock body and locking bar member in cooperative relation thereon.

3,973,421

KEY CONTROLLED SECURITY APPARATUS

George P. Patriquin, Gardner, Mass., assignor to Hudson Lock, Inc., Hudson, Mass.

Filed Apr. 7, 1975, Ser. No. 565,777
Int. Cl.[2] E05B 27/00
U.S. Cl. 70—364 R 17 Claims



1. A lock comprising:

a housing;

an actuator means retained by and rotatable between predetermined stations within said housing, said actuator defining a keyway for receiving a key;

operator means for effecting control functions in response to rotation of said actuator means into said predetermined stations;

locking tumbler means coupled between said housing and said actuator means and extending into said keyway, said locking tumbler means being biased in a locking position and movable into a shear position by a proper key in said keyway;

locking tumbler blocking means preventing rotational movement of said actuator means from a locked station with said locking tumbler means in said locking positions and allowing rotational movement thereof with said locking tumbler means in said shear positions;

first directional tumbler means coupled between said housing and said actuator means and extending into said keyway, said first directional tumbler means movable between a quiescent position and an active position by a proper key in said keyway;

first blocking means allowing rotation of said actuator means in one direction from said locked station and preventing rotation thereof in the opposite direction with said first tumbler means in said quiescent position, and allowing rotation of said actuator means in said opposite direction from said locked station with said first tumbler means in said active position;

second directional tumbler means coupled between said housing and said actuator means and extending into said keyway, said second directional tumbler means being movable between a primary position and an auxiliary position by a proper key in said keyway; and

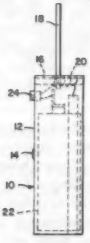
second blocking means allowing rotation of said actuator means in said one direction from said locked station with said second tumbler means in said primary position, and allowing rotation of said actuator means in said opposite direction from said locked station and preventing rotation thereof in said one direction with said second tumbler means in said auxiliary position.

3,973,422

DEFROSTER KEY CASE

Frank Cervera, Yonkers, N.Y., assignor to Lawrence Peska Associates, New York, N.Y., a part interest

Filed Feb. 11, 1975, Ser. No. 549,069
Int. Cl.[2] A45C 11/32; H05B 3/06
U.S. Cl. 70—431 1 Claim

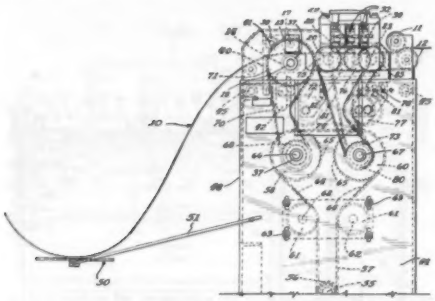


1. In a key case having a pair of opposed sidewalls and a pin extending between said sidewalls, said pin being of a diameter for rotatably and slideably carrying keys thereon, the improvement comprising: a heater coil wrapped about said pin in heat transfer relationship therewith; a battery within said case; and switch means carried by said case in a series circuit with said battery and said heater coil.

3,973,423
BELT DRIVE SYSTEM FOR HIGH SPEED STRAIGHTENING MACHINES

Chester M. Wiig, Lincolnwood, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed June 9, 1975, Ser. No. 584,771
Int. Cl.² B21D 1/02
U.S. Cl. 72—165 12 Claims

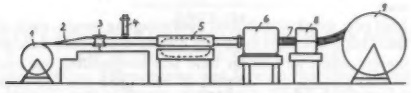


1. In a drive for a feeding and straightening machine of the type having at least one pair of co-acting pinch rolls and a plurality of lower straightening rolls, individual shafts for journalling said pinch rolls and said straightening rolls respectively, a drive motor, a pair of countershafts also journalled for rotation and being located intermediate the drive motor and the lower straightening rolls, a timing belt drive operatively connecting the drive motor with the intermediate countershafts, a second timing belt drive for driving said pinch rolls from one of the countershafts, and other timing belt drives for driving the straightening rolls from said countershafts.

3,973,424
PRODUCTION OF CORRUGATED TUBING

Friedrich Albes, Stadthagen; Werner Kleemann, and Gerhard Ziemek, both of Hannover, all of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Germany

Filed Jan. 9, 1975, Ser. No. 539,809
Claims priority, application Germany, Jan. 9, 1974, 2400842
Int. Cl.² B21D 15/00
U.S. Cl. 72—177 5 Claims

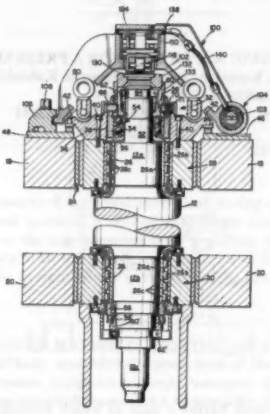


1. An apparatus for corrugating tubing, comprising:
a corrugating means for corrugating metal tubing;
a braking means for exerting a braking force on corrugated tubing exiting from the corrugating means to slow the movement of the corrugated tubing; and
a feeding means for feeding tubing to the corrugating means and braking means, whereby longitudinal axial force is applied to the tubing in the corrugating means between the feeding means and braking means.

3,973,425
AXIAL PRELOADING DEVICE FOR AXIALLY ADJUSTABLE GROOVED WORK ROLLS

Harold E. Woodrow, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed Nov. 7, 1974, Ser. No. 521,751
Int. Cl.² B21B 31/18
U.S. Cl. 72—247 4 Claims

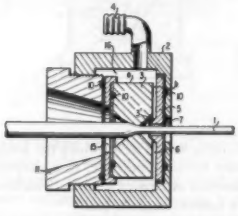


1. In a rolling mill having a work roll journalled for rotation between bearings contained in chocks, the said chocks being adapted to be removably mounted in a roll housing, with an adjustment means having one component which is rotatable in relation to another component for axially adjusting the work roll in relation to said chocks, the improvement comprising a fluid-actuated piston-cylinder assembly for exerting an axially directed force on said adjustment means to thereby eliminate mechanical backlash between said components.

3,973,426
METHOD OF COOLING STEEL WIRE

Tatsu Fujita; Heijiro Kawakami, both of Kobe; Yoshiro Yamada, Akashi, and Tetsuo Yamada, Kobe, all of Japan, assignors to Kobe Steel Limited, Kobe, Japan

Filed June 24, 1974, Ser. No. 482,578
Claims priority, application Japan, June 23, 1973, 48-70941
Int. Cl.² B21C 9/00
U.S. Cl. 72—286 19 Claims



1. A method for cooling a steel wire and one or more dies within a dry lubricant drawing system, characterized in that said method comprise the steps of:
providing said wire with dry lubricant prior to the passage thereof through each of said dies and passing said wire through each of said dies under dry lubricant conditions;

drawing a steel wire to a desired dimension, through each of said dies; and

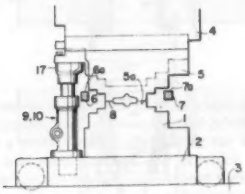
immediately bringing a cooling liquid into direct contact with both the rear portion of each of said dies, including a back relief portions thereof, and said steel wire as said wire is passing through and within the vicinity of each of the die exits, in a manner so as to effect the cooling of said wire and each of said dies before the commencement of strain-aging embrittlement within said wire.

3,973,427

MOLD CHANGING APPARATUS FOR A PRESS MACHINE

Syoziro Shirao, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed June 11, 1975, Ser. No. 586,081
Int. Cl.² B21J *13/08*
U.S. Cl. 72—448 2 Claims



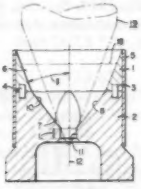
1. Press machine having a slide to which an upper mold is secured, a movable bolster to which a lower mold is attached for cooperation with the upper mold, and transfer bars for transferring work pieces successively, wherein the improvement comprises a pair of upper mold supporting mechanisms secured to the bolster, said mechaisms having upper mold mounting members movable up and downward so as to mount the upper mold thereon and raise the same above the transfer bars.

3,973,428

UNIFORM LAND LENGTH DIE

Robert Lugosi, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 7, 1975, Ser. No. 565,501
Int. Cl.² B21C *25/02*
U.S. Cl. 72—467 23 Claims



1. A die comprising:

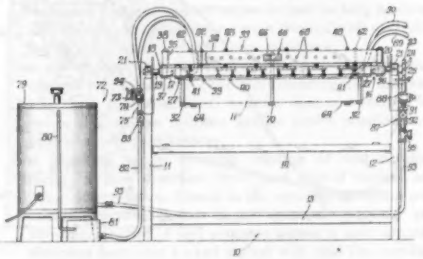
1. a shaping portion which determines the ultimate shape of a billet passed through said die, said shaping portion,
   a. in cross-section enclosing a space which is both a polygon and a convex region, and
   b. having all internal surfaces which are parallel to the die axis of equal length; and
2. an entry portion having two internal surfaces,
   a. a conical surface sloping towards said shaping portion at an angle A to said die axis, and
   b. a faceted portion which consists of a flat facet leading from each side of said polygon to said conical surface at an angle to said die axis at least as great as angle A.

3,973,429

TEST APPARATUS FOR ENGINE HEADS

Virgil R. C. Durgan, Tremont, and Milton J. Palma, Pekin, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 14, 1975, Ser. No. 595,649
Int. Cl.² G01M *15/00*
U.S. Cl. 73—49.7 26 Claims



1. In apparatus for testing engine heads of internal combustion engines of various sizes for fluid tightness of internal cavities in a head which communicate with ports in the fire deck surface of the head, said apparatus including first flexible conduit means for supplying fluid from a pressurized fluid source to said cavities through certain ones of said ports and second flexible conduit means for venting fluid from said cavities through certain others of said ports, the improvement comprising, in combination:

a base;

a rectangular mounting frame on said base which has narrow end plates and long side beams, said frame being at least as long as the largest head to be mounted thereon;

means for detachably mounting a head of any of various sizes on said mounting frame with the fire deck surface uppermost;

a pair of longitudinally extending, substantially parallel support rails;

means mounting said support rails on said mounting frame above and in alignment with the fire deck surface;

a plurality of stopper means each of which includes an upright mounting stem with a resilient stopper at its lower end;

at least two, quick attachment fluid coupling means, each of said coupling means including a body with a fluid passage therethrough, an annular fluid seal surrounding one end of said passage and adapted to bear upon the fire deck surface surrounding one of said certain ports, means at the other end of the passage for fluid tight attachment of one of the flexible conduit means, and an upright mounting stem surmounting said body;

means for securing each of said mounting stems in a depending position on one of said support rails at any desired location between the ends of the rails, so that each stopper means and each coupling means is aligned with one of the ports in the fire deck surface;

and means for forcing each of said stopper means and coupling means resiliently downwardly into sealing engagement with the fire deck surface at the rim of the port with which it is aligned.

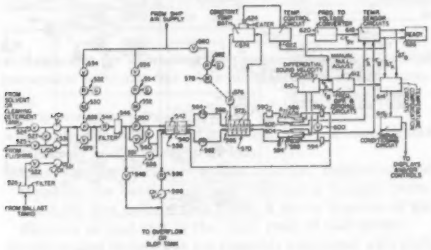
3,973,430
WATER POLLUTION MONITOR

Uldis Cirulis, Midland Park, and Ellis M. Zacharias, Jr., Ridgewood, both of N.J., assignors to Process and Pollution Controls Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 383,405, July 27, 1973, Pat. No. 3,892,127. This application Mar. 11, 1975, Ser. No. 557,393

Int. Cl.² G01N *29/02*

U.S. Cl. 73—61.1 R **60 Claims**



1. In a system for measuring the concentration of hydrocarbons in water while the liquid is flowing from a source thereof, the improvement comprising:

means for selecting a continuous sample of the flowing liquid;

separator means for separating the hydrocarbons from the water to deliver a standard solution at its output;

means for diverting a portion of the same sample to the separator means;

a differential transducer assembly having a first transducer assembly having a first electroacoustic transducer and a first housing, and a second transducer assembly having a second electroacoustic transducer and a second housing;

first connecting means connecting the standard solution output of the separator to the first housing;

second connecting means connecting the second housing to the source of the sample (unknown);

pressure equalizing means connected to the output of the first housing and the output of the second housing;

a discharge line connected after the pressure equalizing means such that the standard solution flows through the first housing to the discharge line and the unknown solution flows through the second housing to the discharge line;

excitation means for exciting the first transducer and the second transducer to thereby produce an acoustic wave in each of the housings;

difference measuring means for measuring the difference between the sound velocity in the second housing and that in the first housing which difference is a function of the concentration of hydrocarbons in the unknown.

3,973,431
DEVICE FOR THE RAPID MEASURING OF THE DEGREE OF HUMIDITY OF SUBSTANCES

Louis Ginhoux, Villeurbanne, and Jacques Flesselles, Fleury les Aubrais, both of France, assignors to CGEE Alsthom, Levallois-Perret and Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, both of, France

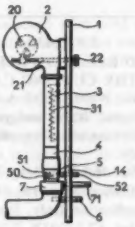
Filed June 18, 1975, Ser. No. 587,801

Claims priority, application France, June 20, 1974, 74.21503

Int. Cl.² G01N *25/56*

U.S. Cl. 73—76 **1 Claim**

1. Improvement in a device for the rapid measurement of the degree of humidity of substances comprising a diffuser intended for passing hot air produced in an oven through these substances, the said substances being contained in a cup whose bottom is permeable to air and in which the desiccation of the substances is effected under the effect of the passing of the hot air, the improvement consisting in a diffuser consisting of a cylindrical nozzle of circular cross section comprising a first diaphragm arranged on the same side as a stove having a



flat ring concentric with said nozzle and having a circular hole in its central portion, a second diaphragm arranged on the same side as the cup constituted by a circular plate drilled at its periphery with the nozzle, with a series of holes arranged substantially at right-angles to the ring of the first diaphragm.

3,973,432
LACQUER HARDNESS TESTING APPARATUS

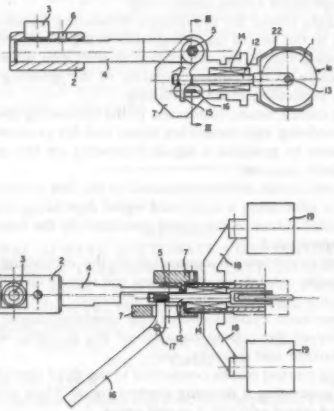
Alain Toulc'hoat, and Michel Papot, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

Filed May 21, 1975, Ser. No. 579,585

Claims priority, application France, May 21, 1974, 74.17572

Int. Cl.² G01W *3/46*

U.S. Cl. 73—81 **5 Claims**



1. Apparatus for testing the hardness of lacquers, notably on the bodies of motor vehicles, for estimating the quality of the lacquer curing process and determining whether the temperature of the oven utilized for this process is adequate, this apparatus comprising a wheel having along its outer periphery a central sharp edge for engagement with the lacquer surface to be tested, and a weight exerting a certain pressure on said wheel, which is mounted for free rotation in a fork rigid with one end of a horizontal rod having its outer end associated with a vertical lever through means allowing an angular movement of said rod and vertical lever, said vertical lever being similarly connected to another horizontal lever supporting

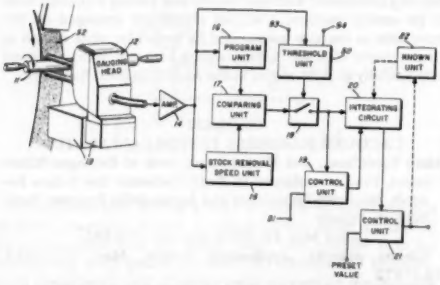
said weight at its free end so as to exert a constant force on said wheel for indentation of the lacquer surface with said wheel sharp edge to form an impression in the surface from which the hardness properties of the lacquer coating may be determined irrespective of the position of the tested lacquered surface.

3,973,433

METHOD AND RELATIVE APPARATUS FOR CONTROLLING THE CUTTING CAPACITY OF THE GRINDING WHEEL OF A GRINDER

Mario Pozzetti, Bologna, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Division of Ser. No. 365,734, May 31, 1973, Pat. No. 3,895,526. This application Mar. 14, 1975, Ser. No. 558,439
Claims priority, application Italy, June 15, 1972, 3459/72
Int. Cl.² G01N *3/56*
U.S. Cl. 73—104 **7 Claims**



1. Apparatus for checking the cutting capacity and controlling the dressing of the grinding wheel of a grinding machine, the machine including machining control means for controlling its operation cycles, comprising:

measuring means for providing a measuring signal responsive to the size of the workpieces being machined;

processing means for calculating at least one quantity responsive to the cutting capacity of the grinding wheel, said processing means including:

first circuit means connected to the measuring means for receiving said measuring signal and for processing the same to generate a signal depending on the speed of stock removal;

second circuit means connected to the first circuit means for generating a combined signal depending on subsequent values of the signal generated by the first circuit means; and

third circuit means connected to the measuring means and to at least one of said first and second circuit means for triggering the latter in determined phases of the operation cycles to make said combined signal indicative of the cutting capacity of the grinding wheel to provide said quantity; and

dressing control means connected to the third circuit means for generating a dressing control signal when said combined signal exceeds a preset value.

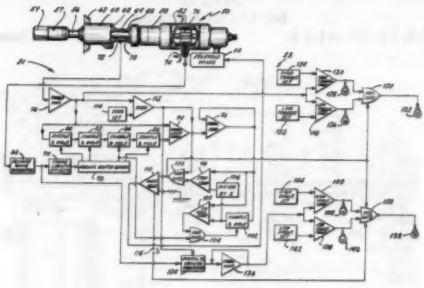
3,973,434

TIGHTENING SYSTEM WITH QUALITY CONTROL APPARATUS

Stanley K. Smith, Lansdale, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Sept. 19, 1974, Ser. No. 507,545
Int. Cl.² B25B *23/14*
U.S. Cl. 73—139 **14 Claims**

1. A tightening system for tightening a fastener to a predetermined tightened condition, said system including wrench means for imparting input tightening characteristics to said fastener, means asociated with said wrench means for measuring said input tightening characteristics and providing first signals indicative of the instantaneous values thereof, means for providing second signals representative of desired instantaneous values of said input tightening characteristics at said



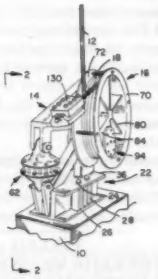
predetermined tightened condition, control means operatively associated with said wrench means for shutting off said wrench means at said predetermined tightened condition, and quality control means for continuously checking said first signals with respect to said second signals and providing an indication thereof.

3,973,435

CABLE ANCHOR

Elmer L. Decker, Long Beach, and James Moon, Santa Ana, both of Calif., assignors to Decker Engineering, Long Beach, Calif.

Filed Apr. 18, 1975, Ser. No. 569,583
Int. Cl.² G01L *5/08*
U.S. Cl. 73—143 **7 Claims**



1. An improved cable anchor comprising:

a base member which is adapted for mounting to a foundation of a derrick;

a drum for receiving a cable around at least a portion of its circumference;

a spindle connected to said drum for allowing rotational movement of said drum on said spindle;

spindle support means connected to said base member for supporting said spindle thereon;

a weigh beam welded to said drum; and,

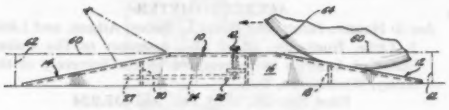
a reinforcing brace connected to said weigh beam extending upwardly in welded relationship to the outer portion of said drum for reinforcing said drum and said weigh beam.

3,973,436

TIRE-INFLATION APPRAISAL APPARATUS

Gerald H. Lenderman, Box 354, Seattle, Wash. 98936

Filed Nov. 17, 1975, Ser. No. 632,639
Int. Cl.² B60C 23/06
U.S. Cl. 73—146.2 5 Claims



1. Apparatus for appraising the road engagement pattern of a pneumatic vehicular tire while mounted on a vehicle, comprising:

means providing a treadway;

a plurality of parallel elongated levers disposed beneath said treadway in alignment therewith;

means forming a common axis fulcrum transverse said treadway for said levers, said axis being located proximate the first ends of said levers, a minor fraction of the distance of said axis to the other ends of said levers;

an upstanding depressible pin operably associated with each lever first end and extending through and above said treadway; and

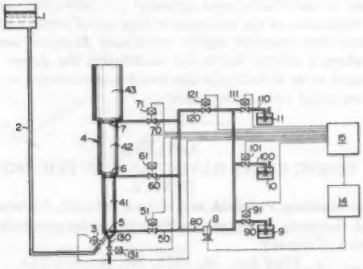
said treadway, including means providing a window located to permit viewing of the other ends of said levers while a tire is standing on said upstanding pins to permit appraisal of the road engagement patterns of such tire.

3,973,437

SYSTEM FOR METERING LIQUID

Kazuhiko Yanagihara, and Hideo Takeda, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed July 10, 1974, Ser. No. 487,179
Claims priority, application Japan, July 11, 1973, 48-78072
Int. Cl.² G01F 3/36, 23/18
U.S. Cl. 73—219 9 Claims



1. A system for measuring liquid level wherein a predetermined amount of liquid is repeatedly measured comprising in combination:

a measuring cylinder into which liquid is supplied for measurement and from which measured liquid is exhausted, wherein the diameter of said measuring cylinder increases discretely from the lower part to the upper part thereof, to define a plurality of measuring sections in fluid communication with each other so that liquid can pass freely among the plurality of measuring sections,

electromagnetically operated valve means provided in liquid supply and exhaust pipes communicated with said measuring cylinder,

a plurality of pressure transmitters located in the measuring cylinder at different levels, each pressure transmitter being associated with one section of the plurality of sections and measuring the pressure of the liquid above said pressure transmitter, one of the pressure transmitters being located at the bottom of the measuring cylinder,

pressure transformer means connected with said pressure transmitters for transforming pressure into an electric output signal,

control means connected with said pressure transformer means for controlling said valve means according to the electric output signal transmitted from the pressure transformer, and

switching means connected to said pressure transmitters for selectively making one of the pressure transmitters communicate with the pressure transformer means so that only the pressure transmitter located immediately below the level of liquid to be measured in the cylinder may transmit the pressure sensed thereby to the pressure transformer means.

3,973,438

COMPOSITION FOR FORMING THERMO-PARTICULATING COATING WHICH PROTECTS ELECTRICAL APPARATUS

James D. B. Smith, Turtle Creek, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 21, 1973, Ser. No. 390,284
Int. Cl.² G01K 1/02, 3/00; G08B 21/00
U.S. Cl. 73—339 R 19 Claims

1. In a method for protecting electrical apparatus from damage due to overheating, said apparatus including a gas stream and a monitor suitable for detecting particles in said gas stream and for emitting a signal when said particles are detected, which method comprises detecting the presence of particles in said gas stream, the particles resulting from the decomposition of a thermal-particulating coating applied to said electrical apparatus at positions exposed to said gas stream, the improvement wherein the thermal-particulating coating applied comprises malonic acid and a solution of a resinous carrier stable and solid at 80°C, the solvent in said solution being evaporated.

3,973,439

METAL ACETYL ACETONATE COMPOSITION FOR FORMING THERMOPARTICULATING COATING

James D. B. Smith, Turtle Creek, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1975, Ser. No. 568,221
Int. Cl.² G01K 1/00
U.S. Cl. 73—339 R 24 Claims

1. A method of protecting electrical apparatus from damage due to overheating and for thereafter determining the location of said overheating, said apparatus including a gas stream and a monitor for detecting particles in said gas stream and for emitting a signal when said particles are detected, comprising:

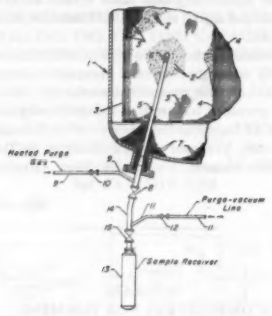
A. preparing a composition which comprises at least one metal acetylacetonate and a solution of a resinous carrier curable and stable at 60°C, and unreactive with said metal acetylacetonate;

B. applying said composition to said electrical apparatus at positions exposed to said gas stream;

C. evaporating the solvent in said solution; and

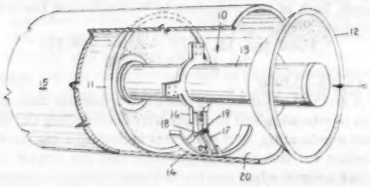
D. monitoring said gas stream for the presence of particles therein.

3,973,440
CATALYST SAMPLING METHOD
John E. Vande Ven, Bensenville, Ill., and Steven M. Fischer, Jacksonville, Fla., assignors to Universal Oil Products Company, Des Plaines, Ill.
Filed Apr. 28, 1975, Ser. No. 572,603
Int. Cl.² G01N 1/14
U.S. Cl. 73—421 B 3 Claims



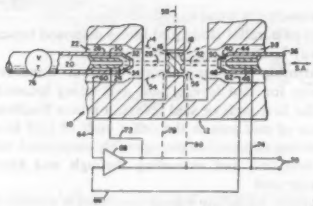
1. A method of transferring a catalyst sample from a sampling point within a vessel containing a bed of catalyst into a withdrawal conduit having a downward-facing catalyst entrance port, and of transferring the catalyst sample into a sample receiver located outside of the vessel which comprises the steps of:
a. sealing the withdrawal conduit to gas flow at a point intermediate the sampling point and the sample receiver;
b. evacuating the sample receiver and creating a pressure therein lower than that maintained in the vessel; and,
c. rapidly unsealing the withdrawal conduit and passing a short and rapid gas flow through the withdrawal conduit, which equalizes the pressures within the vessel and the sample receiver, and effecting a fluidization of catalyst into the entrance port of the withdrawal conduit and the transfer of catalyst through the withdrawal conduit to the sample receiver.

3,973,441
ACCELEROMETER PIG
Patrick C. Porter, Rexdale, Canada, assignor to Trans Canada Pipelines Limited, Toronto, Canada
Filed Nov. 14, 1975, Ser. No. 631,934
Claims priority, application Canada, Nov. 12, 1975, 239395
Int. Cl.² G01B 5/28
U.S. Cl. 73—432 R 6 Claims



1. In combination a pipeline pig, said pig being adapted to be moved along a pipeline and to carry at least one device for inspecting the condition of the wall of a pipeline from within the pipeline, said inspection device providing an electrical signal indicative of changes in the condition being sensed, an accelerometer adapted to provide an electrical signal indicative of acceleration and deceleration of said pig in the direction parallel to the axis of said pipeline, and a recorder, said recorder being adapted to record the signal from said inspection device and the signal from said accelerometer.

3,973,442
FLUIDIC DIRECT-IMPACT MODULATOR ACCELEROMETER
Joe S. Hunter, Huntsville; Escar L. Bailey, Athens, and Little J. Little, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Nov. 28, 1975, Ser. No. 635,824
Int. Cl.² G01P 15/02
U.S. Cl. 73—515 8 Claims

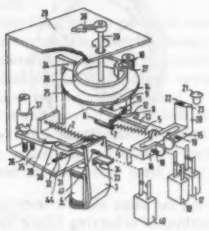


1. A fluidic accelerometer for measuring acceleration along an axis of the accelerometer comprising: a housing that defines a fluid impact chamber; a pair of power jet tubes for directing two power jet fluid streams into said chamber, said power jet tubes being mounted in said housing in an opposing position so that the longitudinal axes of the tubes conincide and the power jet tubes discharge toward one another; a proofmass disposed in said chamber at a point where the axially opposing power jet streams impact the proofmass said proofmass having surfaces contoured so that the streams are reflected from the proofmass in the form of radial cones; detector means for detecting the position of said radial flow cones in said fluid impact chamber and providing signals that are indicative of the positions of said radial cones and control means that receives signals from said detector means and develops a control signal for modulating the power jet fluid streams so as to maintain the proofmass centered to produce symmetrical radial flow cones.

3,973,443
TIMING RELAY HAVING AN ELECTRIC MOTOR DEVICE
Alois Muhling, Pleinfeld, and Helmut Schmidt, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany
Filed Apr. 24, 1975, Ser. No. 571,233
Claims priority, application Germany, Apr. 29, 1974, 2420651
Int. Cl.² F16H 5/74
U.S. Cl. 74—3.5 11 Claims

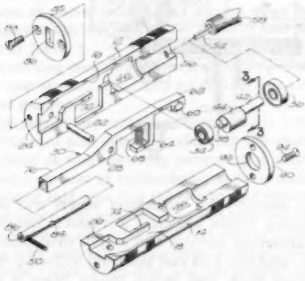
1. In a timing relay having an electric motor drive in which a clutched gear wheel is driven through gears by the relay motor and engages an indexing gear wheel through a shifting of its drive shaft on switching on of the timing relay and is disengaged after a predetermined delay time has expired, and which timing relay includes means for the delayed actuation of at least one switching contact, said means comprising a displaceably arranged actuating element coupled by a spring to the armature of a solonoid with the displacement of the actuation element controlled by the indexing gear wheel, the improvement comprising:
a. the actuating element and the indexing gear wheel arranged in parallel planes one over the other;

b. means on said actuating element for causing the engagement and disengagement of said clutched gear wheel with said indexing gear wheel;



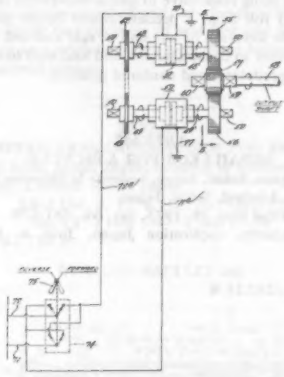
c. means causing said actuating element to be displaced a first distance in one direction to cause engagement of said clutched gear wheel upon actuation of the armature; and
d. means to cause said actuation element to be displaced a further distance in the same direction upon the expiration of the predetermined delay time.

3,973,444
HAND-HELD OSCILLATING TOOL
Harold R. Skinner, Sylmar, Calif., assignor to Textron, Inc., Valencia, Calif.
Filed Sept. 5, 1974, Ser. No. 503,229
Int. Cl.² F16H *25/08*
U.S. Cl. 74—54 **4 Claims**



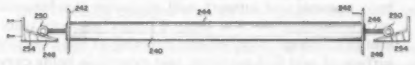
1. A hand-held oscillating tool detachably connectable to an external power source comprising:
a housing including first and second opposed housing members defining a cavity;
undivided rocker arm means pivotally supported within said cavity and having one end portion thereof extending from said housing;
eccentric cam means rotatably journaled within said cavity and engaging the opposite end of said rocker arm;
means for receiving an external drive member to rotate said cam means;
spring means disposed between said housing and said rocker arm means intermediate said opposite end and the pivotal support of said rocker arm means for continuously urging said opposite end of said rocker arm means into engagement with said cam means whereby upon rotation of said cam means said one end of said rocker arm means reciprocally oscillates; and
attachment means on said one of said rocker arm means for attaching a tool thereto.

3,973,445
CONVERSION MECHANISM FOR LINEAR TO ROTARY MOTION
Hyde Whitcomb Ballard, Barto, Pa. 19504
Filed Oct. 1, 1974, Ser. No. 511,070
Int. Cl.² F16H *27/02*
U.S. Cl. 74—89.21 **10 Claims**



1. Mechanism for converting linear motion to unidirectional rotary motion comprising a first shaft reciprocating in a linear path, pressure responsive means for moving said first shaft, a second shaft journaled to rotate on its axis, a third shaft journaled to rotate on its axis, connecting means between said first shaft and each of the second and third shafts, said connecting means adapted to turn the second and third shafts in opposite directions on each linear reciprocation of the first shaft, a single output shaft drivingly connected to each of said rotating second and third shafts, and means in each of said rotating shafts for selectively engaging and disengaging said rotary shafts to said output shaft whereby the output shaft turns in the same direction upon reciprocation of the first shaft.

3,973,446
WEB ALIGNER
Michael Vasilantone, 34 Columbia Road, Branchburg Township, Somerville, N.J. 08876
Continuation-in-part of Ser. No. 407,162, Oct. 17, 1973, abandoned. This application Nov. 27, 1974, Ser. No. 527,911
Int. Cl.² F16H *7/18;* **B65G** *15/62;* **B65H** *25/26;* **D02J** *3/14*
U.S. Cl. 74—241 **14 Claims**



1. A web aligning device for a continuously moving web comprising a framework adjacent to said web,
a guide roll receiving said web,
end plates on said roll the distance between said end plates being approximately the width of said web,
a shaft, said roll being mounted on said shaft for rotatable and lateral movement relative thereto,
a pair of lifters affixed to said framework and rotatably supporting said shaft on each end thereof,
said lifters each comprising a support adjacent said web, a ramp on said support and pivoted about a horizontal axis intermediate its length, said ramp having a lower end portion and an upper end portion on opposite sides of

said axis, a shaft end supporting means on said lower end portion, sensing means engaging an adjacent end plate of said roll for sensing lateral movement thereof, actuating means connected to said sensing means and engaging the upper portion of said ramp, whereby lateral movement of said roll is sensed by said sensing means and said actuating means is caused to pivot said ramp to raise and lower said lower portion and the end of the shaft supported thereon,

said lifters being responsive to lateral movement of said web and said roll from a predetermined center position to cause the lowering of one end of said roll and the lifting of the other to cause said roll and said web to slide back to said predetermined centered position.

3,973,447

DERAILLEUR FOR A BICYCLE

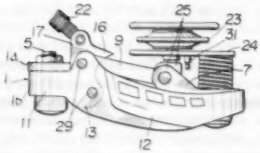
Masashi Nagano, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Sakai, Japan

Filed May 28, 1975, Ser. No. 581,679

Claims priority, application Japan, June 6, 1974, 49-66675[U]

Int. Cl.² F16H 7/12, 7/10

U.S. Cl. 74—242.11 B **5 Claims**



1. A derailleur for a bicycle, comprising:

a. a fitting member for mounting on a bicycle frame;

b. first and second parallel linkage members pivoted at one end to said fitting member and having upper surfaces, said first linkage member being locatable outwardly of the bicycle frame and said second linkage member being locatable inwardly of said first linkage member;

c. a support carrying chain guide cages having two rotatable chain guide pulleys, said support being pivoted to the other ends of said linkage members and being rotatable with respect to said fitting member; and

d. said fitting member including a main body and a first extension extending at one end from one side of said main body towards said support, said extension at substantially an intermediate portion thereof projecting outwardly of said first linkage member and covering at least the upper surface of said first member, said extension being curved at the other end to cover the outside of said support, whereby said extension guards said first linkage member and said support.

3,973,448

ELECTRIC HOISTS

Edwin R. Michelsen, Rte. 1, Box 33, Clinton, Minn. 56225

Filed May 9, 1973, Ser. No. 358,635

Int. Cl.² F16H 1/20, 1/06, 37/06

U.S. Cl. 74—421 R **2 Claims**

1. In combination with (1) through (51) one or more protruding shafts (17), (18), (19) and (20) supporting reversing electric drills attached by means of geared chucks, with such drills being prevented from turning by a drill-connecting cross (44) or case mounted fixture (50) and with any and all electric drills receiving the same electric impulse command from one switch; a method of achieving lifting force.

3,973,449

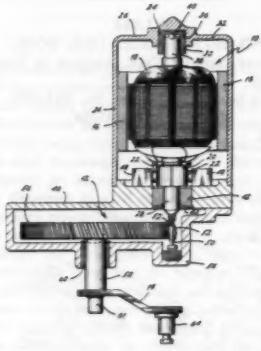
WINDSHIELD WIPER DRIVE ASSEMBLY

Bernard E. Berlinger, Jr., Meadowbrook, Pa., assignor to Quaker City Gear Works, Inc., Huntingdon Valley, Pa.

Filed May 22, 1975, Ser. No. 579,855

Int. Cl.² F16H 1/12, 55/06; A47L 1/00; B60S 1/02

U.S. Cl. 74—421 A **6 Claims**



1. A drive assembly for windshield wipers and the like comprising motor means including a rotatable output shaft operatively connected thereto, said output shaft including a helical pinion rotatable with said shaft and including no more than five helical teeth, said helical pinion being in driving engagement with a helical gear fixed to a rotary shaft whereby said helical pinion drives said helical gear and said rotary shaft, said teeth on said helical pinion being formed with relatively flat apex and continuously arcuate side walls, said teeth further forming a relatively small angle with the longitudinal axis of the gear, an arm member fixed to said rotary shaft for rotation therewith, said arm member including means for connecting said arm member to a windshield wiper linkage whereby rotation of said arm member drives said windshield wipers.

3,973,450

DYNAMIC TOOTH CLUTCH

Noah Alvin Shealy, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Mar. 24, 1975, Ser. No. 561,520

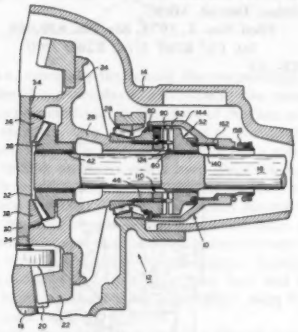
Int. Cl.² F16H 1/44, 1/40

U.S. Cl. 74—710.5 **21 Claims**

1. A dynamic tooth clutch interposed between a rotatable first member operating at a first speed and a rotatable second member operating at a second speed, said clutch comprising:

a. a first collar slidably mounted on one of said members, said first collar having, on one end, a plurality of equally angularly spaced axially extending radial first outer teeth, said first outer teeth being angularly aligned with a plurality of equally angularly spaced axially extending radial first inner teeth;

b. a second collar fixed to the other of said members, said second collar having, on one end facing said first collar one end, a plurality of equally angularly spaced axially extending radial second outer teeth substantially similar in size, location and angular spacing to said first outer teeth, said first and second outer teeth being arranged to intermesh and being so angularly spaced that, upon initial intermeshing, when said first outer teeth are centered relative to said second outer teeth, there can be a first predetermined amount of bidirectional angular rotational movement therebetween before either of the side surfaces of one of said first or second outer teeth abut the adjacent side surfaces of the other of said first or second outer teeth;



c. a cam ring confined between an inner peripheral surface of said second collar and an end surface of the other of said members;

d. complementary retaining means on the inner peripheral surface of said second collar and the outer peripheral surface of said cam ring permitting a second predetermined amount of bidirectional angular rotational movement of said cam ring relative to said second collar;

e. preloaded and self-centering yieldable means for centering said cam ring relative to said second collar and returning said cam ring to a center position, relative to said second collar, when said first and second outer teeth are disengaged;

f. a plurality of equally spaced axially extending second inner teeth on said cam ring, said second inner teeth being angularly aligned with said second outer teeth when said cam ring is centered relative to said second collar, said second inner teeth being substantially similar in location and angular spacing to said first inner teeth, said first and second inner teeth being arranged to directly intermesh, with the combined tooth depth or axial extent of the side surfaces of said pluralities of said first and second inner teeth being greater than the combined tooth depth or axial extent of the side surfaces of said pluralities of said first and second outer teeth, so that, when said first collar is axially displaced toward said second collar, if said first and second inner teeth are not so angularly aligned as to permit meshing therebetween, the opposing axial end surfaces of said first and second inner teeth will abut while there still is clearance between the opposing axial end surfaces of said first and second outer teeth; and

g. means for axially displacing said first collar relative to said second collar, with the force for displacing said first collar toward said second collar being less than that of said preloaded self-centering yieldable means, thus permitting direct meshing of said first and second inner teeth and complete centered intermeshing of said first and second outer teeth, prior to the angular displacement of said cam ring relative to said second collar, thereby allowing full axial intermeshing of said first and second outer teeth before there is abutment and subsequent torque transfer between either of the side surfaces of one of said first or second outer teeth with the adjacent side surfaces of the other of said first or second outer teeth, with said angular displacement of said cam ring permitting substantially shock free coupling of said first and second members up to a predetermined defference between said first and second speeds.

3,973,451

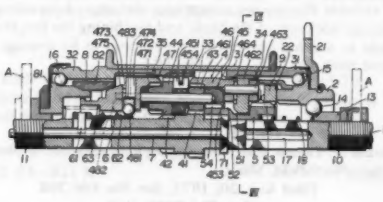
FIVE SPEED TRANSMISSION HUB FOR BICYCLES

Masayoshi Kine, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Sakai, Japan

Filed Dec. 6, 1974, Ser. No. 530,379

Int. Cl.[2] F16H *3/44*; F16D *67/00*

U.S. Cl. 74—750 B **8 Claims**



1. A five-speed transmission hub comprising;

a. a hub shell having first, second and third ratchets,

b. a fixed shaft extending through the center of said hub shell,

c. two sun gears of different diameter from each other and fixed to said fixed shaft respectively,

d. two kinds of planet gears engaged with said sun gears respectively,

e. a right ring gear and a left ring gear, having inner teeth engageable with said planet gears respectively,

f. a gear frame supporting said planet gears,

g. first rotary speed transmitting pawls, at least one of which is supported with said right ring gear in a relationship of being engaged with or disengaged from said first ratchet,

h. second rotary speed transmitting pawls, at least one of which is supported with said left ring gear in a relationship of being engaged with or disengaged from said second ratchet,

i. third rotary speed transmitting pawls, at least one of which is supported with said gear frame so as to be incessantly engaged with said third ratchet,

j. a driving means having an inner surface and rotatably supported between said fixed shaft and said hub shell,

k. a clutch selectively transmitting the driving force from said driving means to either said gear frame or said right ring gear, said clutch being adapted to be movable along said fixed shaft, thereby controlling said first speed transmitting pawls in engagement with or disengagement from the first ratchet,

l. means for moving said clutch, and

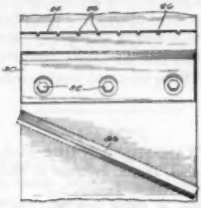
m. a control means controlling said second pawls in engagement with or disengagement from the second ratchet, said control means being attached to said means for moving said clutch so as to be movable together therewith.

3,973,452

METHOD OF MAKING A PERFORATING BLADE

Christopher F. Masters, 2525 S. Shore Drive, Milwaukee, Wis. 53207

Continuation-in-part of Ser. No. 317,838, Dec. 22, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,839
Int. Cl.² B21K 5/12
U.S. Cl. 76—101 A 5 Claims



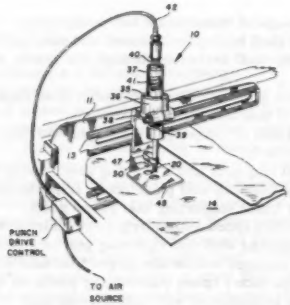
1. A method of making perforating blades from steel blade blanks for a knife roll for web perforating apparatus and in which the knife roll contains a plurality of perforating blades of variable thicknesses comprising the step of measuring the average thickness of the blade and machining the height of the blade to a value negatively proportional to its average measured thickness.

3,973,453

RADIAL LINE PUNCH

Gerald N. Tameo, East Providence, R.I., assignor to Sheldahl, Inc., Northfield, Minn.

Filed Aug. 20, 1975, Ser. No. 606,308
Int. Cl.² B26F 1/18
U.S. Cl. 83—30 4 Claims



1. In combination with a punch assembly for perforation of flexible film products with cooperatively arranged punch and die assemblies, punch drive means and control means for said punch drive means:

a. said punch assembly including frame means for retaining reciprocating punch means and stationary die means, first and second punch assemblies, each including a punch member mounted on said frame means and including drive means for stroking said punch members in reciprocatory to-and-fro motion for extension and retraction thereof along a certain linear path;

b. a die assembly mounted on said frame means and having a punch receiving bore formed therein;

c. said first punch member comprising a shank portion with a concave cutting tip at one end thereof and having a plurality of radially converging grooves formed therein adjacent said cutting tip and converging radially inwardly toward said cutting tip so as to form a plurality of radially extending cutting line faces extending generally diametrically of said tip with said cutting faces having an inwardly converging profile and a common intersecting point along the axis of said shank; and

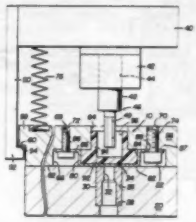
d. said second punch member comprising a cutting line face disposed in radially spaced relationship from said first cutting line face and extending generally in projected continuation with one of said diametrical extending cutting faces.

3,973,454

STRIPPER INSERT AND METHOD OF MAKING AND USING THE STRIPPER INSERT

Stanley H. Eller, Burton, Mich., assignor to Stripper Insert Corporation, Detroit, Mich.

Filed Nov. 7, 1975, Ser. No. 630,066
Int. Cl.² B26F 1/14; B26D 7/00
U.S. Cl. 83—55 10 Claims



1. For use in a sheet metal punching assembly including a reciprocal stripper plate and a punching tool reciprocal relative to the plate, a stripper insert comprising a dished metal retainer having a peripheral flange, means for securing the retainer to the stripper plate, and a plastic component surrounded by the retainer flange so that said component can be retained by said retainer for reciprocation with said plate, the plastic component when so retained having a reduced thickness portion for alignment with the reciprocal punching tool of the punching assembly, the stripper insert when so retained to be punched by said reciprocal punching tool to form a bore therethrough (a) which is substantially perpendicular to the reduced thickness portion of the plastic component and (b) which has a configuration substantially identical to the cross-sectional shape of the punching tool.

8. In a method of punching sheet material, the steps of:

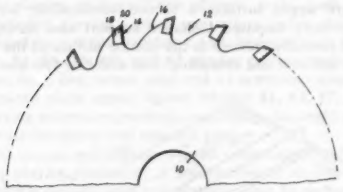
1. securing a stripper insert to a sheet punching assembly in interposed, vertical alignment between a reciprocable punching tool and an opening in a lower die shoe, the insert including a dished metal retainer and a solid plastic segment in alignment with the punching tool;
2. downwardly displacing the punching tool to sequentially (a) axially advance the punching tool through the stripper insert to punch a slug from the solid plastic segment and form an opening therein having a configuration substantially identical to the cross-section of the punching tool and (b) extend the punching tool at least partially into the lower die shoe opening;
3. vertically retracting the punching tool;
4. positioning sheet material on the lower die shoe in vertical alignment with the reciprocable punching tool;
5. downwardly displacing the punching tool to sequentially (a) advance through the previously punched opening in the stripper insert and (b) advance through the sheet material to punch and opening therein; and
6. vertically retracting the punching tool.

3,973,455

SAW

Mathew A. Slaats, and J. Richard Slayton, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Filed Mar. 10, 1975, Ser. No. 556,706
Int. Cl.² B27B 33/08
U.S. Cl. 83—56 15 Claims



1. In a saw, especially for sawing fibrous materials such as wood and the like; a circular planar support disc rotatable on a central axis perpendicular to the plane of the disc and having peripheral recesses with generally radial forwardly facing surfaces, each forwardly facing surface of each recess being notched to receive an insert and a hard wear resistant insert fixed in each notch, each insert having a forward side and an outer end face and lateral sides, each insert having a cutting point at the juncture of said forward side and outer end face and one lateral side, said cutting point being disposed laterally and radially outside the range of said support member, each of said forward side and said outer end face and said one lateral side inclining inwardly in a direction away from said point at an angle of about 5° to 15°.

8. A method of sawing wood and like fibrous materials to produce a surface having cleanly cut fiber ends for gluing to a like surface, said method comprising; providing cutting teeth on the periphery of a saw body with each tooth having a cutting point defined by intersecting generally planar surfaces of the tooth body respectively, each cutting point being disposed axially outside the range of the saw body, inclining the surfaces of each tooth body which extend rearwardly and radially away from the respective cutting point and which meet at the cutting point from about 5° to about 15° in a direction to provide clearance behind the cutting point, rotating the saw body, and advancing the saw body in the plane thereof into a workpiece at a rate such that each region of the surface being cut is engaged a single time only by a said cutting point.

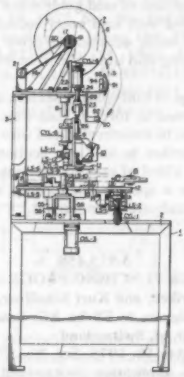
3,973,456

COIL-LIKE ARTICLE SUPPLY DEVICE

Tsutomu Suzuki, Kawasaki; Takeo Matsumoto, Tokyo, and Masahiro Sobukawa, Niiza, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed July 22, 1975, Ser. No. 598,003
Claims priority, application Japan, July 25, 1974, 49-85360; May 12, 1975, 50-61269[U]; May 12, 1975, 50-61270[U]; June 14, 1975, 50-72149
Int. Cl.² B26D 5/20
U.S. Cl. 83—209 8 Claims

1. A coil-like article supply device comprising a base, a delivery mechanism mounted on the base, for sequentially delivering a large number of coil-like articles and a rope inserted through the coil-like articles, a separation mechanism for receiving by a prescribed number said coil-like articles delivered from said delivery mechanism along said rope and separating and releasing said prescribed number of coil-like articles one by one with a prescribed timing, a supply mechanism provided facing said separation mechanism and movable for receiving said coil-like articles released from said separation mechanism to supply them to a proper place, a feed mechanism so provided as to be reciprocatingly moved between said supply mechanism and said separation mechanism, for pulling with a prescribed timing said rope inserted into said separation mechanism, and a cutting mechanism provided



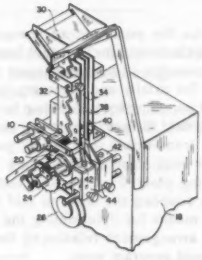
facing said supply mechanism, for cutting with a prescribed timing said rope pulled by said feed mechanism.

3,973,457

FEED MECHANISM FOR COMPONENT PARTS

Franciscus Jozef A. Storimans, Stouffville, Canada, assignor to Frank Storimans Limited, Vandorf, Gormley, Canada

Filed Nov. 24, 1975, Ser. No. 634,367
Int. Cl.² B26D 7/06
U.S. Cl. 83—411 R 7 Claims



1. A component feeder for feeding electrical components, of the type having a main body portion and wire leads projecting from opposite ends thereof, to a component forming machine or the like comprising

a. a frame having a pair of guide walls spaced from one another a distance sufficient to permit the body portion of a component to pass therebetween,

b. guide track means extending through each of said guide walls for receiving and guiding the leads of the components as they pass through the frame, each of said guide track means having an inside edge and an outside edge and a serially connected entry section, spacing section and exit section,

c. spacer disc means rotatably mounted in said frame for rotation about its axis with a portion of its marginal edge overlying said spacing section of said guide track,

d. transmission means for driving said spacer disc means in a synchronized relationship with respect to said component forming machine,

e. notch means in said marginal edge of said spacer disc, said notch means having a depth to overlie said spacing section of said guide track means as it passes thereover,

said notch means having a forwardly directed face and a rearwardly directed face with respect to the direction of rotation of said disc, said notch means being adapted to permit transfer of a lead wire from said entry section to said spacing section of said guide track means when said notch is aligned with said entry section, said forwardly directed face being adapted to drive a lead wire of a component along said track means in response to rotation of said disc,

f. said inside edge of said spacing section having an ejection shoulder adapted to force a lead wire out of the notch which carries it to transfer the lead wire and its associated main body portion to said exit section for engagement with a feeder wheel of said component forming machine or the like in a spaced relationship with respect to a subsequently delivered component.

3,973,458
DEVICE FOR PUNCHING PROGRAM STRIPS

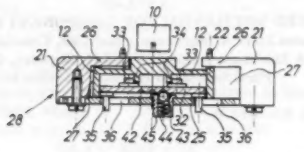
Walter Reich, Moriken, and Kurt Schaffner, Reinach, both of Switzerland, assignors to Elteba AG, Lausen and Perforag Ltd., Aarau, both of, Switzerland

Filed May 19, 1975, Ser. No. 578,904

Claims priority, application Switzerland, May 17, 1974, 6806/74

Int. Cl.² G06K *1/10*

U.S. Cl. 83—414 **5 Claims**



1. In a device for punching an elongated program strip, which device includes a punching tool formed of a punch and a die plate, a movable slide arrangement engagable with said program strip for axially and transversely aligning said strip relative to said punching tool, said strip being movable at least axially through said slide arrangement, and a housing including means for transversely and axially guiding said slide arrangement, the improvement comprising

a first locking plate fixed to said slide arrangement for releasably coupling the latter to said housing and including guide means for determining the axial movement of said slide arrangement relative to the axial direction of travel of said program strip,

a second locking plate meshed with said first locking plate so as to be releasably movable with respect to said housing transversely to the direction of travel of said program strip, said second locking plate being provided with first quick stop recesses for fixing the transverse position of said slide arrangement and second quick stop recesses for fixing the axial position of said slide arrangement relative to the axial direction of travel of said program strip,

a base member upon which said housing is pivotally mounted, and

a punch arm so pivotally connected to said housing as to be pivoted by pivotal movement of said housing, said punch arm having mounted thereon at least one component of said punching tool.

3,973,459
MAT CUTTING APPARATUS

Charles Terry Stowe, 3553 S. Urbana, Tulsa, Okla. 74135

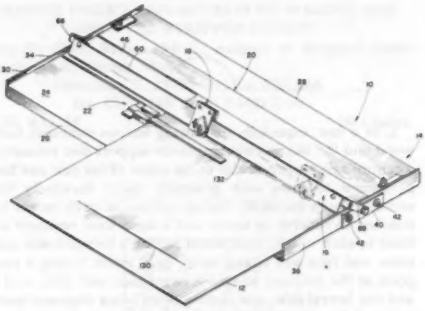
Filed Nov. 6, 1975, Ser. No. 629,279

Int. Cl.² B26D *3/02, 7/02*

U.S. Cl. 83—455 **5 Claims**

1. A picture mat cutting apparatus comprising:

a baseboard having a flat upper surface for supporting matting material thereon, a straight back edge and oppositely disposed parallel side edges perpendicular to said back edge, parallel sidewalls attached to each side edge and extending upwardly above the board upper surface, a first L-shaped support arm having one end thereof pivotally secured to the outside surface of one sidewall and the free end extending over said sidewall above the board upper surface, a second substantially identical oppositely disposed L-shaped support arm having one end pivotally secured to the outside surface of the opposite sidewall and extending over said sidewall above the



board upper surface, a cutter guide rail means comprising upper and lower elongated flat leaves joined along the edge to form a V-shaped cross-section and disposed parallel to the back edge of the board, the upper leaf being attached at each end to the free ends of the support arms and movable therewith so that the lower leaf is contactable with the board upper surface and the rear edge of said lower leaf extends rearwardly and the edge of the upper leaf extends upwardly and rearwardly when the guide rail is pivoted downwardly toward the board upper surface, cutting means slidably attachable to the upper leaf edge and having a cutting blade on the lower edge thereof.

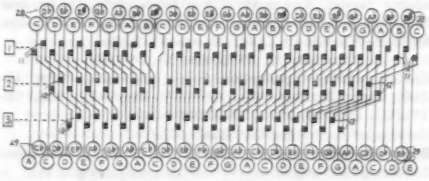
3,973,460
KEYBOARD TYPE MUSICAL INSTRUMENT

Donald K. Coles, 2505 Capitol Ave., Fort Wayne, Ind. 46806

Filed Sept. 18, 1974, Ser. No. 507,118

Int. Cl.² G10C *3/12*; G10H *1/00*

U.S. Cl. 84—1.01 **3 Claims**



1. In a keyboard musical instrument, apparatus for converting from a diatonic musical scale to an irregular hexatonic scale comprising:

a plurality of tone actuator means respectively arranged to provide a twelve tone scale with 12 equal intertone intervals per octave, each equal to one semitone,

a continuous keyboard having a plurality of manually actuated alternately disposed upper and lower digitals, individual digitals being coupled to individual tone actuator means so that when a particular digital is actuated it plays a particular pitch, said digitals labeled in order by consecutive numbers K increasing from left to right on the key-

board, including a central number K = 50 labeling a lower digital which plays a selected pitch,

switching means having at least first and second switch states for converting said instrument respectively from a keyboard arrangement containing fourteen digitals per octave span to a keyboard arrangement containing twelve digitals per octave span,

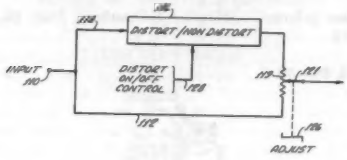
in said first switch state, any seven consecutive lower digitals playing pitches of the diatonic scale, each digital labeled K playing a pitch one octave below that pitch played by a digital labeled K+14, lower digitals labeled 52, 54, 56, 58, 60, and 62 playing pitches respectively two, four, five, seven, nine and 11 semitones above said selected pitch, upper digitals labeled 51, 53, 57, 59, 61 playing pitches respectively one, three, six, eight and 10 semitones above said selected pitch,

in said second switch state, any six consecutive lower digitals playing pitches of a predetermined six tone scale which is derived from said diatonic scale by the omission of one of its seven tones, upper digitals playing intermediate pitches, digitals labeled K playing pitches one octave below those pitches played by digitals labeled K+12.

3,973,461
DISTORTION CONTROL CIRCUIT

Edward R. Jahns, Fullerton, Calif., assignor to CBS Inc., New York, N.Y.

Filed Aug. 15, 1974, Ser. No. 497,820
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.24 **18 Claims**



1. A distortion circuit for an electrical musical instrument that produces an electrical musical signal, said circuit comprising:

an input terminal adapted to receive said electrical musical signal,

an electronic valve having a control electrode connected to said input terminal, and having first and second output electrodes, said valve having a resistance circuit connected in series with said output electrodes, said resistance circuit including switch means for selectively varying the magnitude of the resistance in series circuit with said output electrodes from a relatively high resistance value to a relatively low resistance value,

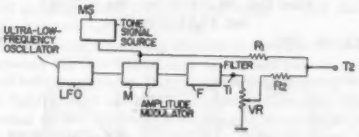
a voltage divider connected between said control electrode and a point in said resistance circuit, and an output terminal connected to a selectively variable point on said divider,

said electronic valve comprising a cathode follower having a grid electrode, plate electrode and cathode electrode corresponding respectively to said control electrode, and said first and second output electrodes, said switch means comprising a diode having one side connected to ground, said resistance circuit including first and second resistors connected in series between the other side of said diode and said cathode electrode, said plate electrode being connected to a source of positive potential, a third resistor connected between the other side of said diode and a source of negative potential, said third resistor being considerably larger than both of said first and second resistors, and manually operated switch means for controlling conduction of said diode.

3,973,462
FREQUENCY-DEVIATION METHOD AND APPARATUS

Yasuji Uchiyama, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Division of Ser. No. 81,011, Oct. 15, 1970. This application July 15, 1971, Ser. No. 163,034
Claims priority, application Japan, Oct. 15, 1969, 44-8212; Oct. 15, 1969, 44-8213; Oct. 15, 1969, 44-8214; Oct. 15, 1969, 44-8215; Oct. 16, 1969, 44-98574[U]; Oct. 16, 1969, 44-98575[U]; Oct. 17, 1969, 44-98804[U]
Int. Cl.² G10H *1/04*
U.S. Cl. 84—1.25 **9 Claims**

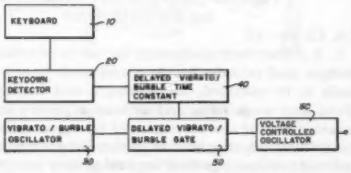


1. A method of generating tremolo effects comprising the steps of: providing a musical tone modulating signal of a given frequency; providing a carrier signal of a frequency lower than said given frequency; amplitude modulating said carrier signal with said modulating signal; whereby a modulated output signal is produced having a first signal component of a frequency deviated above said given frequency of said musical tone signal by a deviation equal to the frequency of said carrier signal to be modulated and a second signal component of a frequency deviated below said given frequency of said musical tone signal by said deviation, passing said modulated output signal and said musical tone signal through respective variable resistances to thereby vary the mixing ratio of the two signals, and then mixing the modulated output signal and said musical tone signal at selected amplitude levels.

3,973,463
DELAYED VIBRATO AND BURBLE CIRCUIT

Wilford R. Schreier, Bensenville, Ill., assignor to Hammond Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 447,905, March 4, 1974, Pat. No. 3,898,905. This application Mar. 3, 1975, Ser. No. 554,436
Int. Cl.² G10H *1/02*, *5/02*
U.S. Cl. 84—1.25 **4 Claims**



1. In combination in an electronic musical instrument:

a plurality of selectively actuable control elements for controlling the sounding of musical notes;

detector means for detecting a selected condition of said control elements to produce a control signal;

means for producing musical tone signals including at least one voltage controlled oscillator;

oscillator means for producing electrical signals for modulating said voltage controlled oscillator;

a single gate circuit for controlling the application of said modulating electrical signals to said voltage controlled oscillator; and

time constant circuit means coupled to said gate circuit and said detector means comprising a first time constant means responsive to said control signal to operate said

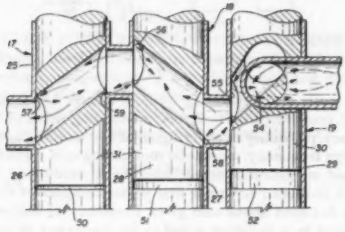
gate only during an initial time interval to produce a musical effect called burble, a second time constant means responsive to said control signal to operate said gate only after a preselected time interval to produce a musical effect called delayed vibrato, and means for selecting one of said time constant circuits to be operative during any particular time interval.

3,973,464

PISTON VALVED BRASS-WIND MUSICAL INSTRUMENT

Donald A. Novy, 1000 S. Monaco Parkway, Denver, Colo. 80220

Filed Oct. 30, 1975, Ser. No. 627,201
Int. Cl.² G10D 9/04
U.S. Cl. 84—392 11 Claims



1. A piston valved brass-wind musical instrument of the type having tubing defining an air column, a valve comprising a valve casing traversing said tubing and portedly connected thereto, a valve piston slidable within said casing and having a circular bore connecting the casing ports, wherein the improvement comprises said piston and said casing having a precise offset from perfect alignment between the casing ports and piston bore.

3,973,465

AUTOMATIC PRIMER FEED FOR SHOTGUN SHELL RELOADER

Theodore J. Bachhuber, and Philip C. Bachhuber, Jr., both of Mayville, Wis., assignors to Mayville Engineering Company Incorp., Mayville, Wis.

Filed Mar. 24, 1975, Ser. No. 561,120
Int. Cl.² F42B 33/00
U.S. Cl. 86—45 13 Claims

1. A primer feed mechanism for use in combination with a shotgun shell reloader having a work table to support shotgun shells to be reloaded, and having a tool carriage mounted above said work table and at least a primer inserting tool mounted on said tool carriage, and having reloading actuation means for producing relative motion between said work table and said tool carriage to bring said primer inserting tool into contact with a deprimed shotgun shell, said primer feed mechanism comprising a primer tray mounted on said tool carriage, said primer tray being dimensioned to hold a plurality of shotgun shell primers therewithin and having a dispenser opening therein, means urging primers on the tray toward said dispenser opening, primer dispenser means for moving one primer at a time over said dispenser opening when actuated to drop said primer through said dispenser opening, a dispenser tube attached to said tray under said dispenser opening and extending downwardly therefrom and terminating above a predetermined primer delivery location with respect to said work table, and means coupling said reloading actuation means to said primer dispenser means to cause one primer to drop down said dispenser tube at a predetermined position of said reloading actuation means for each time a primer is to be inserted in a shell by said primer inserting tool.

3,973,466

METHOD FOR CHEMILUMINESCENTLY DETECTING INFILTRATION OF PROTECTED PERIMETERS AND THE LIKE

Rudolph J. Marcus, Sierra Madre, and Eugene E. Gloye, Whittier, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 3, 1973, Ser. No. 376,069
Int. Cl.² F41F 5/00
U.S. Cl. 89—1 A 4 Claims

1. A method of detectng movements of particular objects across a particular area comprising:

forming a quantity of chemiluminescent microcapsules by encapsulating minute droplets formed entirely of chemiluminescent filler compounds in a film-forming coating material of a type that is hardenable in situ into a water-insoluble air-tight impermeable and seamless shell immiscible and non-reactive with said filler compound, and

distributing said quantity of microcapsules evenly over said area in sufficient concentration to assure contact with said objects as they move across the area,

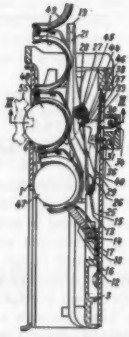
said shell frangibility being such that said contact crushes the shells for exposing said filler compounds and permitting said compounds to chemiluminesce whereby said movements can be observed.

3,973,467

CARTRIDGE INFEED APPARATUS FOR AN AUTOMATIC FIRING WEAPON

Jürg Zellweger, Neerach, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed May 9, 1975, Ser. No. 575,952
Claims priority, application Switzerland, May 16, 1974, 6707/74
Int. Cl.² F41D 9/02
U.S. Cl. 89—33 C 2 Claims



1. A cartridge infeed apparatus at an automatic firing weapon, comprising a conveyor channel, said conveyor channel having a side wall possessing a slot extending substantially parallel to the axis of the weapon, the weapon having a breechblock, a number of cartridges located in the conveyor channel wherein each cartridge leading in the direction of conveying of the cartridges is intended to be inserted by the breechblock into the weapon barrel, said leading cartridge partially extending into said slot, a pair of pivotably mounted guide arms, spring means acting at said guide arms for causing the guide arms through the action of the spring means to press the leading cartridge in a direction substantially perpendicular to the conveying direction against said slot, pivotable pawl means arranged at the side of the guide arms opposite the cartridge, cam means provided with control surfaces provided for the pivotable pawl means, said cam means serving to

actuate said pawl means and bearing upon a further cartridge located in the conveying direction behind the leading cartridge, and wherein the pawl means can be pivoted out of a work position in which said pawl means is positioned behind the guide arms during the insertion of the cartridge into a rest position in which the guide arms are rocked against the force of the spring means.

3,973,468

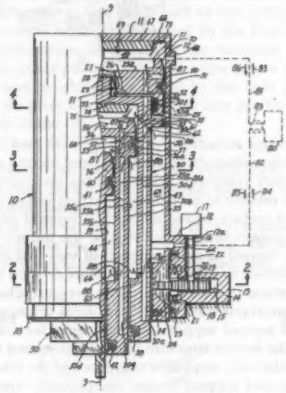
MULTI-STAGE EXTENDIBLE AND CONTRACTIBLE SHAFT WITH SHOCK ABSORPTION

Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262

Continuation-in-part of Ser. No. 418,073, Nov. 21, 1973, Pat. No. 3,957,125, which is a continuation of Ser. No. 177,592, Sept. 3, 1971, abandoned. This application Aug. 2, 1974, Ser. No. 494,196

Int. Cl.[2] F15B *15/22;* **F01B** *11/02*

U.S. Cl. 91—25 **8 Claims**



1. In an extendible and contractible shaft having a plurality of shaft members having a common longitudinal axis, each shaft member having a head at an end thereof, and each, except the outermost shaft member, being telescoped within the one next adjacent,

the head of each telescoped shaft member comprising a piston slidably seated to the inner wall of the next adjacent outer shaft member to form a series of tandem arranged sealed pistons having respective cross-section areas which progessively increase from the innermost piston sealed to the outermost shaft member, each of said piston having a first side and a second side, a first fluid pressure surface defined on said first side of each pistons, a second fluid pressure surface defined on said second side of each of said pistons, said second fluid pressure surface extending circumferentially outwardly from each of said shaft members towards the next adjacent shaft member, a third fluid pressure surface defined on said second side of each of said pistons except the innermost piston, said third fluid pressure surface extending circumferentially inwardly from each of said shaft members except the innermost towards the longitudinal axis.

a fluid passageway through each piston, except the innermost piston in the tandem of said pistons so that said first fluid pressure surfaces of said first sides of all the pistons are in fluid communication with each other,

fluid passageways between adjacent shaft members,

first fluid communication means providing fluid communication between adjacent fluid passageways at positions at the second sides of the respective pistons, so that said second fluid pressure surfaces of all the pistons are in fluid communication with each other, second fluid communication means providing fluid communication between said first fluid pressure surfaces and said third fluid pressure surfaces of each of said pistons except the innermost and

a first inlet port means communicating with said first fluid pressure surface of one of said pistons and a second inlet port means communicating with said second fluid pressure surface said one of said pistons,

whereby application of fluid pressure at said first inlet port means introduces pressurized fluid to said first sides of the pistons, which extends the length of said shaft, and application of fluid pressure at said second inlet port means introduces pressurized fluid to said second sides of said pistons, which contracts the length of said shaft,

the improvement comprising:

means providing a metering channel in the path of fluid flow between the first side of said one of said pistons and said first inlet port means, thereby permitting metered release of fluid toward said first inlet port means near the end period of the contraction movement of said one piston, and causing blockage of fluid flow at the metering means at the end of said period, and

means comprising a channel through said one piston providing fluid communication between the second fluid communication means and the first inlet port means thereby by-passing said blockage.

whereby the contraction movement of said one piston is slowed, thereby alleviating shock, and then stopped, whereupon fluid continues to be released to said first inlet port means, so that said period of slowing is accomplished without affecting the rate of movementof another piston during said perid.

3,973,469

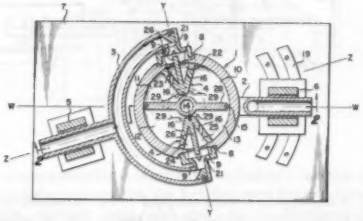
FLOATING CHAMBER MACHINE

John Humen, P.O. Box 877, Elkton, Md. 21921

Filed Dec. 16, 1974, Ser. No. 533,334

Int. Cl.[2] F01B *15/00;* **F01C** *9/00;* **F15B** *13/04*

U.S. Cl. 91—51 **17 Claims**



1. A floating chamber machine, comprising:

a hollow chamber;

a first support yoke including a fluid passage therethrough and adapted to support said hollow chamber and allow rotational movement thereof about a first axis;

a first yoke support adapted to support said first support yoke and allow rotational movement thereof about and lineal movement along a second axis perpendicular to said first axis;

a second support yoke including a fluid passage therethrough and adapted to support said hollow chamber and allow rotational movement thereof about a third axis bisecting the common intersection of said first and second axes;

a second yoke support adapted to support said second yoke and allow rotational movement thereof about a fourth axis perpendicular to said third axis;

a first divider rigidly affixed to said first support yoke and adapted to fit within said hollow chamber and bisect said hollow chamber along said first axis;

a split divider comprised of two halves, each rigidly affixed to the interior of said hollow chamber on opposite sides of said first divider and adapted to bisect said hollow chamber along said third axis;

first fluid port means adapted to permit fluid flow between said hollow chamber and said first support yoke as a function of angular position therebetween about said first axis; and

second gas port means adapted to permit gas flow between said hollow chamber and said second support yoke as a function of the angular position therebetween about said third axis.

3,973,470

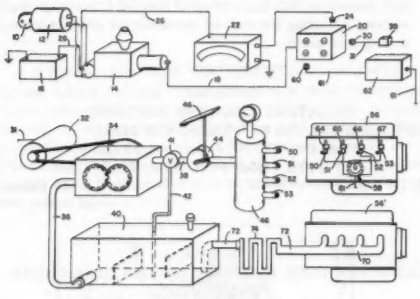
HYDRAULIC INJECTION ENGINE

John E. Fremlin, Walled Lake, Mich., assignor to Ronald H. Fremlin, Tahoe City and Robert E. Fremlin, Berkeley, both of Calif.

Continuation of Ser. No. 486,258, July 8, 1974, abandoned. This application July 25, 1975, Ser. No. 599,278

Int. Cl.² F15B *11/20*

U.S. Cl. 91—413 **5 Claims**



1. A distributor system adapted to be retrofitted to a standard reciprocating piston engine having one or more sets of pistons on opposing cycles to convert the engine into an hydraulic motor, said distributor comprising:

an even number of solenoid valves, each said valve corresponding to a respective cylinder of the piston engine to control the flow of hydraulic fluid to said cylinders;

first and second nearly semicircular juxtaposed contact surfaces having a common axis, one contact surface electrically connected to the solenoid valves associated with one piston of each set and the other contact surface electrically connected to the solenoid valves associated with the other piston of each set; and

a rotor radially mounted interior of the contact surfaces and rotatable about the common axis of the contact surfaces, the tip of said rotor being electrically conductive and adapted to contact the respective contact surfaces in turn to provide intermittent electrical connections therebetween, said rotor tip being connected to an electrical power source to serially activate first solenoid valves associated with one piston of each set and then the solenoid valves associated with the other piston of each set to operate the piston engine with hydraulic fluid.

3,973,471

MOTORS

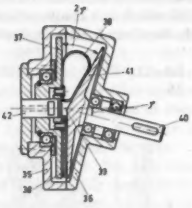
Georg Hirmann, Zurich, Switzerland, assignor to Inventa AG fur Forschung und Patentverwertung Zurich, Zurich, Switzerland

Continuation of Ser. No. 400,565, Sept. 25, 1973, abandoned. This application July 14, 1975, Ser. No. 595,699

Claims priority, application Switzerland, Sept. 27, 1972, 14147/72

Int. Cl.² F01B *13/04*

U.S. Cl. 91—472 **8 Claims**



1. A motor actuated by a fluid pressure medium comprising a rotatable output drive shaft, first and second support means having axes relatively inclined at an intersecting angle and movable relative to each other, said first support means having a conical surface facing the second support means, said first support means being connected to the output shaft to cause rotation thereof upon movement of said first support means, a multi-lobed, rosette shaped structure divided into a plurality of independent, freely distortable pressure chambers having freely distortable outer peripheral areas arranged between the first and second support means, means for connecting each lobe of the rosette structure only to said second support means over a relatively small area compared to the total surface area of the second support means, and pressure control means for admitting said fluid pressure medium into each pressure chamber sequentially to cause movement of the first support means and rotation of the output shaft and permitting said fluid pressure medium to be expelled from each pressure chamber after the maximum volume of each chamber has been attained.

3,973,472

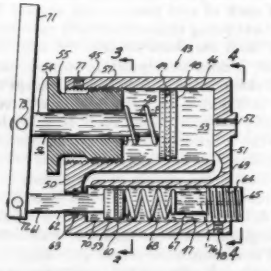
THROTTLE CONTROL MECHANISM FOR AN ENGINE

Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262

Filed Jan. 13, 1975, Ser. No. 540,396

Int. Cl.² F01B *3/00*

U.S. Cl. 92—13.6 **10 Claims**



1. Throttle control mechanism comprising:

a first cylinder with a closure at each end thereof;

a first piston reciprocatable within said first cylinder;

a first piston rod connected to said first piston and extending through one of said first cylinder closures to the exterior of the first cylinder;
a second cylinder with a closure at each end thereof;
a second piston reciprocatable within said second cylinder;
a second piston rod connected to said second piston and extending through one of said second cylinder closures to the exterior of said second cylinder;
a member pivoted to both said piston rods at respective separated pivots outside of said cylinders;
fluid inlet means into a region of said first cylinder at one side of the first piston and into a region of said second cylinder at one side of the second piston;
whereby pressurized fluid introduced through said fluid inlet means into said cylinders urges both said pistons to move longitudinally within their respective cylinders;
means urging each piston to move longitudinally in the direction opposite that in which the fluid pressure is urging it;
the longitudinal axes of said cylinders being oriented relative to each other so that when each of said pistons moves in the direction in which it is urged by the fluid pressure it has a component of motion in the direction opposite that of the other piston when said other piston moves in the direction in which it is urged by the fluid pressure, whereby the pivot of each piston rod acts as a fulcrum for movement of the other piston rod.

3,973,473

SHOE-DRUM BRAKES FOR VEHICLES

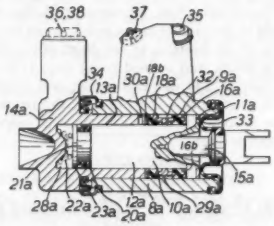
Anthony John Bate, Birmingham, England, assignor to Girling Limited, Birmingham, England

Continuation of Ser. No. 208,359, Dec. 15, 1971, abandoned. This application Mar. 26, 1974, Ser. No. 454,916

Claims priority, application United Kingdom, Dec. 17, 1970, 60082/70

Int. Cl.² F01B 7/20

U.S. Cl. 92—52 **6 Claims**



1. In an hydraulic actuating assembly for a vehicle shoe drum brake comprising an hydraulic cylinder having a wall defining an open-ended first bore, first and second pistons working in said first bore, said first piston having a wall defining a longitudinally extending second bore which is closed at one end, said second piston being of differential outline including larger and smaller diameter portions and having its smaller diameter portion working in said second bore, a first seal cooperating with the second piston and said second bore to define with said closed end a first sealed hydraulic chamber in said second bore, and a second seal axially spaced from said first seal and cooperating with said second piston, said first bore and said first piston to define one side of a sealed second hydraulic chamber in said first bore, a third seal axially spaced from said second seal and cooperating with the larger diameter portion of said second piston and said first bore to define the second side of the second hydraulic chamber, the improvement wherein the first seal normally prevents fluid leakage from said first to said second hydraulic chamber and the second seal prevents leakage from said second to said first hydraulic chamber or to atmosphere and wherein said third seal prevents leakage of fluid from said second chamber to atmosphere, the end of the wall of the first piston adjacent the closed end of said second bore extends axially outwardly beyond the corresponding end of said first bore, an inlet port for the first chamber extending through the side of the outwardly extending part of said wall, said first piston having self-contained passage means independent of said hydraulic cylinder providing communication at all times between said inlet port and said first chamber, and a vent port between said first and second seals and extending radially between said first and second bore, the inner and outer ends of said vent port communicating only with the smaller diameter part of said second piston and the inner surface of said first bore, respectively, and means providing a fluid flow passage between the outer end of said vent port and the exterior of the hydraulic cylinder to provide a visual indication of fluid leaking through said vent port from either said first or second seals.

3,973,474

APPARATUS FOR MAKING BAGS

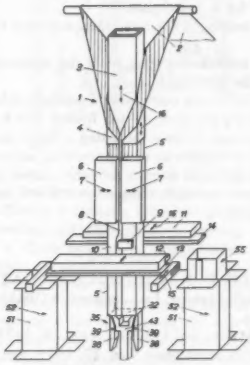
Robert Auckenthaler, Schaffhausen, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Feb. 12, 1975, Ser. No. 549,211

Claims priority, application Switzerland, Feb. 13, 1974, 1995/74

Int. Cl.² B31B 37/26

U.S. Cl. 93—18 **2 Claims**



1. In an apparatus for making bags, including a forming tube of rectangular cross section, the forming tube having opposite small sides, opposite large sides and a length dimension; first seam-forming means disposed below the forming tube for continuously bonding to one another adjoining longitudinal edges of a web material wrapped about the forming tube and advanced in the length dimension thereof; expander means for spreading apart the opposite sides of the hose below the forming tube; second seam-forming means disposed below said forming tube for providing a transverse seam on said hose to form a bottom terminating in ears; a cutting device disposed below the second seam-forming means for transversely severing the hose; the improvement comprising:

a. a dual clamp disposed below said forming tube and having a first and a second jaw pair adjoining the plane of the one and the other small sides of said forming tube, each jaw pair having an open position and a closed position;
b. means for moving said dual clamp towards and away from said forming tube in the length dimension thereof;
c. means for closing said jaw pairs for grasping said ears and pulling said hose off said forming tube during the movement of the dual clamp away from said forming tube; and
d. ear folders disposed externally of said forming tube adjacent each small side of said forming tube, each ear folder

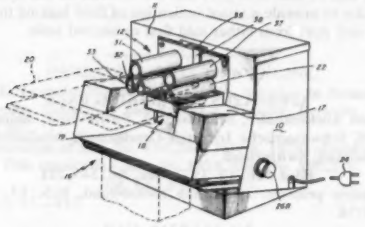
being movable with respect to said forming tube for engaging and bending the ears of said hose.

3,973,475

BOX FORMING MACHINE

Alvin L. Nigrosh, Wayland, Mass., assignor to Hoague-Sprague Corporation, Boston, Mass.

Filed Dec. 20, 1974, Ser. No. 534,719
Int. Cl.² B31B 1/62, 1/64
U.S. Cl. 93—36.3 27 Claims



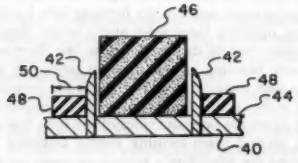
1. A box forming machine comprising;
a reservoir for a liquid glue,
means for feeding a flat box blank adjacent the glue reservoir,
means for transferring glue from the reservoir to an edge area of the box blank,
and means receiving one end of a partially folded box blank for applying pressure to the folded end for a predetermined period of time including a fixed platen having a plurality of lengthwise slots permitting accommodation of boxes of different sizes, a movable platen and means for forcing the movable platen toward and away from the fixed platen.

3,973,476

CUTTING DIE FOR SEALING CORRUGATED BOARD

Elmer Marshall, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Division of Ser. No. 175,144, Aug. 26, 1971, Pat. No. 3,864,200. This application Jan. 27, 1975, Ser. No. 543,995
Int. Cl.² B31B 1/20
U.S. Cl. 93—59 ES 10 Claims



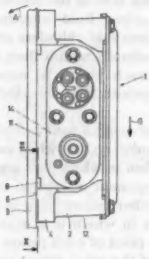
1. An improved cutout die for cutting out holes in a waterproof box blank from a waterproof corrugated board construction comprising, in combination:
a. a frame;
b. a hardened cutting surface means extending above said frame formed in closed array on the frame for cutting out holes in said waterproof corrugated board; and
c. a non-compressable crusher block means, formed on said frame surrounding in close proximity said cutting surface means and extending above said frame but having a height less than said cutting surface means for completely compressing the corrugated board flutes in proximity to the cut made by said cutting surface means to seal the flutes of the board during formation of the box blank.

3,973,477

WATER SPRAY-RESISTANT, VENTILATED HOUSING STRUCTURE

Gert Jakob, Stuttgart, and Willi Gansert, Kornwestheim, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 13, 1975, Ser. No. 586,583
Claims priority, application Germany, Aug. 17, 1974, 2439524
Int. Cl.² H01H 9/04
U.S. Cl. 98—1 14 Claims



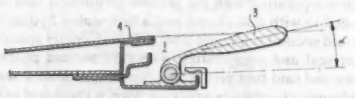
1. Water spray-resistant, ventilated housing structure arranged to prevent entry, or accumulation of moisture within the housing structure, comprising
a housing (2) formed with an attachment surface (6) to a support, and a ventilating duct (7) formed in the surface and extending into the housing interior (14), said ventilating duct extending at an angle with respect to the attachment surface (6) of the housing,
wherein the ventilating duct is generally Y-shaped having two branch ducts (8, 9) of at least approximately equal cross sectional areas, terminating at the outside of the housing in spaced positions and forming an angle with the outside of the housing at the point of termination of said branch ducts, and a third trunk duct (10) connected to the interior (14) of the housing and branching off the branch ducts inside the housing, the trunk duct leading off the branch ducts at an angle with respect to each of the branch ducts.

3,973,478

AIR DEFLECTION FOR SLIDING ROOFS OF MOTOR VEHICLES

Hans Götz, Boblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Aug. 2, 1974, Ser. No. 494,744
Claims priority, application Germany, Aug. 4, 1973, 2339680
Int. Cl.² B60H 1/26
U.S. Cl. 98—2.14 7 Claims



1. An air deflection structure for sliding roofs of motor vehicles which includes air deflector means having a front portion and a rear portion, said front portion being pivotally arranged underneath the sliding roof in a vehicle cross direction, characterized in that said air deflector means includes an air foil means having a profiled air foil cross section with a thicker air foil cross section in the rear portion of said air deflector means for effecting noise-free air flow around said air deflector means at high air flow velocities, said air deflec-

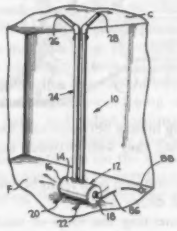
tor means being pivoted up into an operating position to extend under a negative angle of attack of about 5° to about 30° with respect to the roof contour.

3,973,479

FLOOR-CEILING AIR CIRCULATING DEVICE

Isaac C. Whiteley, 1629 S. Canyon Drive, Redmond, Oreg. 97756

Filed June 23, 1975, Ser. No. 589,567
Int. Cl.² F24F 13/06
U.S. Cl. 98—33 A 12 Claims



1. A floor-ceiling air circulating device comprising

base means adapted to be supported on the floor of a room;

duct means extending vertically from said base means defining a first flow path extending from a lower inlet at said base means and terminating at an upper outlet adjacent the ceiling of the room and a second flow path extending from a lower outlet at said base means and terminating at an upper inlet adjacent the ceiling of the room; and

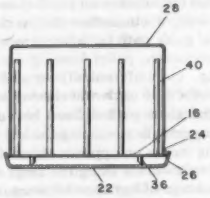
fan means housed in said base means for drawing air from the floor via said lower inlet and forcing the air through said first flow path for discharge at said upper outlet adjacent the ceiling and drawing air from the ceiling via said upper inlet and said second flow path for discharge adjacent the floor at said lower outlet whereby air drawn from the ceiling is replaced by air drawn from the floor and air drawn from the floor is replaced by air drawn from the ceiling.

3,973,480

APPARATUS FOR CANNING FOOD

Ariel Andersen, 1074 Ash Ave., Provo, Utah 84601

Filed May 13, 1974, Ser. No. 469,544
Int. Cl.² A23L 3/10
U.S. Cl. 99—359 4 Claims



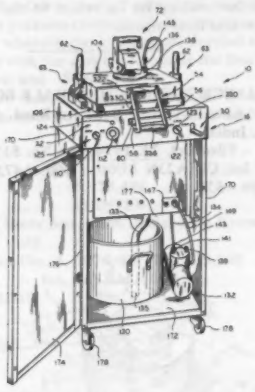
1. An apparatus for canning food and the like comprising a platform with openings in the bottom thereof for receiving steam therethrough, frying pan means for receiving said platform therein; leg means on said platform for supporting it in spaced relationship with said frying pan means and cover means forming a chamber above said platform and detachably supported on said platform for receiving a container of food to be canned, and outlet means in the bottom portion of said chamber to permit air and steam to escape therefrom, said leg means comprising pipes secured to some of said openings and having sloped cut lower ends to permit condensed steam to be carried back to said pan means and other pipes secured to other openings in said pan extending upwardly into said cover means adjacent the top thereof for carrying steam therein.

3,973,481

APPARATUS FOR COOKING CHICKEN

Carl P. Mies, West Bend, Wis., assignor to Mies Filter Products, Inc., West Bend, Wis.

Filed July 24, 1974, Ser. No. 491,390
Int. Cl.² A47J 37/12
U.S. Cl. 99—408 4 Claims



1. In a deep fat fryer arrangement comprising:

a vessel defining a cooking chamber proportioned to receive cooking oil and chicken serving pieces to be cooked, a drain opening at the bottom of said vessel, valve means for opening and closing said drain opening, a holding container positioned to receive cooking oil discharged from said vessel through said drain opening, a removable cover for closing off the top of said vessel, means for clamping said cover in closed relation to the vessel for cooking the chicken serving pieces under pressurized conditions, means for sealing off said chamber when said cover is in closed relation thereto, heater means about said vessel and spaced at a level above the level of the bottom of said vessel for heating cooking oil received in the chamber to a temperature range for cooking chicken serving pieces received in the oil when the oil is in the chamber, and filter means within said chamber and between the level of said heater means and the level of said vessel bottom for filtering therethrough of cooking oil drained from said vessel before it passes through said valve means, and disposed to permit solids in the oil to collect on its upper side,

the improvement comprising:

conduit means extending between said drain opening and said container for conveying cooking oil therebetween, and

means for subjecting said chamber when said cover is clamped in said closed relation and sealed by said sealing means, to differential pressures, when said valve means is open, for inducing flow of the cooking oil through said filter means and said drain opening and between said chamber and said container through said conduit means and free of mechanical pumping action on said cooking oil,

said subjecting means comprising:

means for supplying gas under pressure to said chamber for draining the oil from the vessel, through said filter means,

said valve means and said conduit means, into said container, under fluid pressure conditions in said chamber when said valve means is open,

and means for drawing air from said chamber for establishing vacuum conditions within said chamber to effect return of the oil from the container through said conduit means, said valve means and said filter means, to said chamber, under atmospheric pressure conditions acting on the cooking oil in the container,

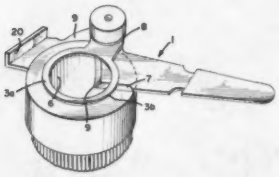
whereby the cooking oil is moved between said chamber and said container through said conduit means free of mechanical pumping action thereon by the differential pressure action of said subjecting means, and the cooking oil in being so moved is filtered both in draining and return from and to the chamber, and materials filtered from the cooking oil on return to the chamber remain below said filter means.

3,973,482

APPLIANCE FOR CUTTING HALF-BOILED EGGS

Sio Pway Khee, 1A, S.N. Banerjee Road, Calcutta-3, West Bengal, India

Filed Oct. 24, 1974, Ser. No. 517,835
Int. Cl.² A23N *15/00, 17/00*; A47J *29/06*
U.S. Cl. 99—537 **9 Claims**



1. An opener for half-boiled eggs, comprising, in combination: two major component parts, namely a first part serving as a container for an egg that can be inserted therein, and a second part serving as a means for tightening the hold of the opener on the inserted egg; means for releasably connecting said two parts, said means comprising internal threads on the inside surface of the lower portion of said second part, and external threads on the outside surface of the upper portion of said first part; one of said two parts including a portion with a substantially axial aperture therein, large enough to allow the top of the inserted egg to extend to the outside; said portion defining with planar portions of said second part a narrow gap that extends from one side of the opener to the other; and an elongate cutting blade pivotally secured at one end to said planar portions of the second part, manually movable in said gap to slice off the top of the egg and thus decapitate the inserted egg.

3,973,483

APPARATUS FOR THE CONTINUOUS PRESSURE TREATMENT OF A WEB

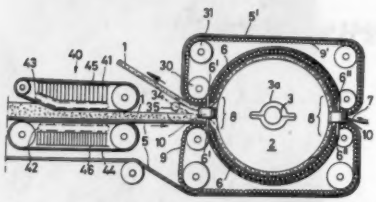
Valentin Appenzeller, Kempen, Germany, assignor to Edward Kusters, Krefeld-Forstwald, Germany

Filed Feb. 26, 1974, Ser. No. 446,097
Claims priority, application Germany, Mar. 9, 1973, 2311909
Int. Cl.² D21G *1/00*; D21F *5/02*
U.S. Cl. 100—93 RP **19 Claims**

1. An apparatus for the continuous pressure treatment of a web comprising a rotatable drum supported for rotation on an axle, said drum having a surface for engaging the web;

first and second sleeves in the shape of sections of a cylinder forming a supporting surface about said drum, said sleeves being disposed around said drum surface for substantially more than 180° forming two gaps at the opposed ends of said sleeves;

first and second movable pressure belts looped about said drum for concurrent movement therewith, each belt being associated with one of said sleeves, said belts entering between the drum and sleeve through one of said gaps and exiting through the other;



friction-reducing means between said sleeves and said belts;

means for feeding said web between said drum and one of said belts;

means for removing said web from between the other of said belts and said drum; and

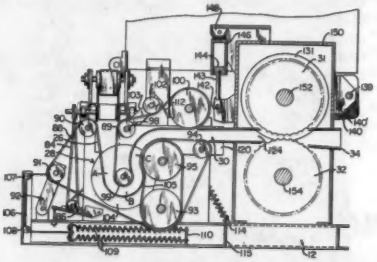
means interconnecting the ends of said sleeves at both of said gaps to impart a tensile stress in said sleeves with said tensile stress applied equally at both of said gaps.

3,973,484

HAY PRESSER APPARATUS

Ronald T. Jarrett, 1625 Knight St., and Edward J. Barrett, 521 S. Tamarack, both of Helena, Mont. 59601

Filed Oct. 29, 1974, Ser. No. 518,255
Int. Cl.² B30B *5/06, 11/00*
U.S. Cl. 100—153 **17 Claims**



4. In a machine for compressing hay and the like into dense, generally pellet-like units, a pair of counter-rotating, co-planar wheels mounted for rotation on parallel axes, each of said wheels provided with a circumferential surface defining a common tangential guide path for advancement and compression of hay therebetween, pellet-forming means defined by radially projecting, circumferentially spaced teeth on the circumferential surface of each wheel adapted to intermesh along the tangential guide path defined between said wheels and adapted to cooperate in advancing the hay along the guide path, hay-confining means on opposite sides of the circumferential surfaces of said wheels along the tangential guide path to constrain the passage of hay therebetween, means to cause displacement of the rotational axis of one wheel with respect to the other to regulate the spacing between the teeth on said wheels along the guide path in accordance with the amount of hay passing along the tangential guide path whereby the teeth on the one wheel are displaceable between an overlapping and nonoverlapping relation to the teeth on the other wheel along the tangential guide path, one of said wheels being movable toward and away from the other wheel to vary the distance between opposing circumferential surfaces along the guide path, and said drive means being operative to vary the rate of

rotation of the one wheel with respect to the other in correlation with its movement toward and away from said other wheel.

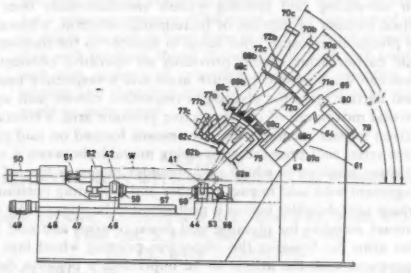
5. In apparatus for pelletizing hay and the like, a compactor unit comprising opposed movable facing surface means movable along a convergent guide path, means for driving said facing surfaces continuously in the same direction along the convergent guide path means including rotatable side flange means substantially covering opposite sides of the convergent guide path, said movable facing surface means cooperating with said side flange means in containing and advancing the hay along the convergent guide path while simultaneously densifying the hay material, coplanar press wheels at the outlet end of said compactor means, said press wheels presenting opposed circumferential surfaces defining a tangential guide path therebetween for continuous advancement and compression of the material from the outlet of said compactor means, side flange members alternately disposed on opposite sides of each press wheel to overlap the opposed circumferential surfaces and defining hay-confining means on opposite sides of the guide path, and pellet forming means defined by radially projecting, circumferentially spaced teeth and pellet-forming notches therebetween on the circumferential surface of said press wheels adapted to cooperate with said side flange members in advancing the hay along the guide path.

3,973,485

PLURAL LINE IMPRINTER FOR GAS CYLINDERS

Isamu Kajimoto, Amagasaki, and Hideaki Morii, Gifu, both of Japan, assignors to Morii Chokoku Co., Ltd., Gifu and Sumikin-Kiko Co., Ltd., Amagasaki, both of Japan

Filed Aug. 8, 1975, Ser. No. 603,226
Claims priority, application Japan, Aug. 19, 1974, 49-94762
Int. Cl.² B41F 17/08
U.S. Cl. 101—7 **6 Claims**



1. An apparatus for imprinting a plurality of lines of markings on each of articles such as steel cylinders for compressed gases, comprising in combination:

a. a loading platform;

b. an unloading platform;

c. work rest means between said loading and unloading platforms, said work rest means being adapted to permit each article to rest horizontally thereon so as to be rotatable about its own axis;

d. first work transfer means for transfer of the articles from said loading platform onto said work rest means one by one;

e. work holding means for releasably holding each article in position on said work rest means against displacement during marking operation while permitting the article to rotate about its own axis;

f. a plurality of marking mechanisms movable relative to said work rest means, each marking mechanism having an axis of rotation and including an arcuate marking surface which has formed thereon a line of characters to be imprinted on each article;

g. first actuator means for successively moving said marking mechanisms to a predetermined marking position where said axis of rotation of each said marking mechanism is in vertical register with the axis of the article held in position on said work rest means;

h. second actuator means for moving each said marking mechanism which has been moved to said marking position back and forth to bring said marking surface thereof into and out of pressure contact with the article on said work rest means, each said marking mechanism being thus moved in a direction perpendicular to a plane tangent to the article on said work rest means at its predetermined different point of contact with said marking surface;

i. means for rotating each said marking mechanism about said axis of rotation thereof while said marking surface thereof is in pressure contact with the article on said work rest means whereby the marking mechanism makes rolling contact with the article to imprint the line of characters thereon; and

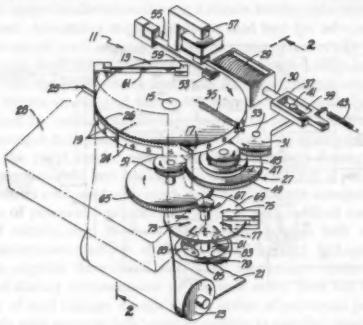
j. second work transfer means for transfer of the marked article from said work rest means onto said unloading platform.

3,973,486

PRINTER

John D. Pylant, Santa Ana, Calif., assignor to Hycom Incorporated, Irvine, Calif.

Filed Dec. 5, 1974, Ser. No. 529,745
Int. Cl.² B41J 1/22
U.S. Cl. 101—93.19 **18 Claims**



1. A printer for printing characters on a medium in response to a print command, said printer comprising:

a supporting structure;

a print member having a peripheral surface;

means defining a plurality of characters on said peripheral surface;

means for mounting said print member on said supporting structure for rotation about a rotational axis;

means for moving the medium over said peripheral surface;

means on the supporting structure for storing energy;

transmission means on the supporting structure for drivingly coupling said energy storing means and said print member so that the energy storing means tends to drive the print member in one direction about said rotational axis;

releasable locking means for holding said print member against rotation in at least said one direction about said rotational axis;

means responsive to the print command for releasing said releasable locking means to thereby allow the energy storing means to drive the print member;

means for stopping the rotation of the print member after it has rotated through a predetermined number of degrees whereby the print member does not rotate when it is not being used;

hammer means cooperable with the characters on the print member after release of said releasable locking means for printing characters on the medium;

means for restoring energy to the energy storing means;

said transmission means including a first member coupled to the energy storing means, said first member being movable in a first direction under the influence of said energy storing means to transmit energy from said energy storing means to said transmission means and movable in a second direction to transfer energy from the restoring means to the energy storing means; and

said transmission means including a one-way clutch which drives when said first member moves in said first direction and which free wheels when said first member moves in said second direction whereby the movement required for restoring energy to the energy storing means is not transmitted to the print member.

3,973,487

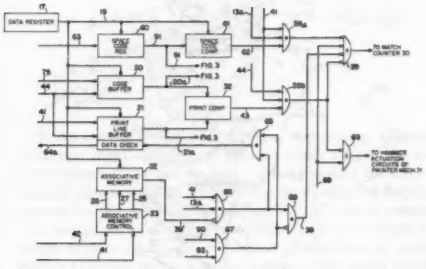
HIGH SPEED PRINTER FOR PRINTING NON-PRINTABLE CHARACTERS AS SELECTABLY CHOSEN PRINTABLE MATES

Ralph W. Mahoney, Telford, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 25, 1974, Ser. No. 445,174

Int. Cl.² B41J 9/38

U.S. Cl. 101—93.29 **4 Claims**



1. In a high speed printer system which comprises, a print member having printable data characters thereon and arranged for cyclically moving a predetermined set of printable data characters past each position in a print line, print hammer means operable when actuated to cause a printable data character on said print member to contact a print paper, and a data source for supplying to said printer system a line of data characters to be printed and wherein said line of data characters may include non-printable data characters, the improvement which comprises: non-printable data character detecting means formed to detect the presence of any one of a group of preselected non-printable data characters in said line of data characters supplied by said data source: printable data character detecting means for detecting when each of the printable data characters on said print member is in a printing position: and hammer actuating signal producing means connected to said non-printable data character detecting means and to said printable data character detecting means and formed to provide a print hammer actuation signal whenever a predetermined one of said printable data characters on said print member is in a position to be printed in place of an associated one of said preselected non-printable data characters from the line of data characters supplied by said data source.

3,973,488

PRINTING UNIT PARTICULARLY INTENDED FOR PRICE LABELLING MACHINES

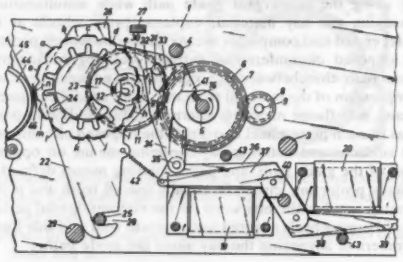
Klaus Heinrich Mielke, Molnlycke, Sweden, assignor to Oscar Adolf Engelbert Wallmark, Bohus, Sweden

Filed Dec. 23, 1974, Ser. No. 535,502

Claims priority, application Sweden, Feb. 4, 1974, 74014444

Int. Cl.² B41J 1/44

U.S. Cl. 101—110 **5 Claims**



1. An improved printing unit, particularly intended for price labelling machines, comprising a plurality of printing wheels, a plurality of pivotally supported carrier arms equal in number to the number of said printing wheels and juxtaposed to each other in side-by-side relationship, means rotatably supporting each of said printing wheels on a respective one of said carrier arms with said printing wheels being positioned in a row and presenting printing matrices on their respective outer peripheries, intermittent drive means having a common driving element operatively coupled to each of said printing wheels for advancing said printing wheels simultaneously over an equal number of degrees of incremental rotation, a plurality of pivotable pressure arms equal in number to the number of said carrier arms, means providing an operative connection between each of said pressure arms and a respective one of said carrier arms for pivoting a respective carrier arm upon pivotal movement of the respective pressure arm, a rotatably driven impact member, shoulder means formed on said pressure arms, said pressure arms being movable between a non-printing position in which said shoulder means is free of engagement with said impact member and a printing position in which said shoulder means is positioned to be engaged by said impact member for pivoting said pressure arms and said carrier arms for bringing the respective printing wheel into engagement with the article to be imprinted, a position determining device responsive to the angular position of said printing wheels, electromagnetic means operatively connected to said position determining device for operation thereby, motion transmitting means operably connected to said electromagnetic means for moving selected of said pressure arms into a position wherein said shoulder means is positioned to be contacted by said impact member for pivotally moving said selected pressure arms and their associated carrier arms for pressing the matrix in printing positon on the associated printing wheel into engagement with the article to be imprinted.

3,973,489

WEB PRINTER

James A. Black, 13700 Sparta Ave., Kent City, Mich. 49330

Filed Oct. 31, 1974, Ser. No. 519,595

Int. Cl.² B41F 15/10, 15/28

U.S. Cl. 101—115 **2 Claims**

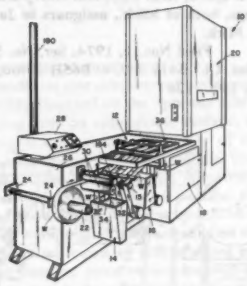
1. A stencil press capable of successively stencilling repeat patterns on individual zones of a web at the same stencilling station comprising:

A. a stencilling station including (I) impression means for supporting web stock for printing, (II) squeegee means

for stencilling on web stock, (III) means for supporting a stencil between said impression means and said squeegee means, and (IV) means for causing relative movement between said squeegee means and said stencil supporting means,

B. web registry means for registration of said zones of the web for stencilling at said impression means; and

C. web advancing and guide means for advancing and guiding successive ones of said zones of a web through a coiled path for repeat passage of individual ones of said successive zones of a web between said stencil supporting means and said impression means and in operative engagement with different ones of said registry means;



said web advancing and guide means including a pressure differential web control unit, said unit comprising a housing defining a chamber, having an opening, and configurated to receive a loop of web through said opening for curvalinear travel of the web into and out of said chamber; said housing including gaseous flow means for creating a gaseous pressure differential across the loop of web to retain the web in loop form in said chamber as successive web portions travel therethrough; said web control unit also comprising orienting means for orienting the ingoing and outgoing zones of the web loop at an acute angle to each other.

3,973,490

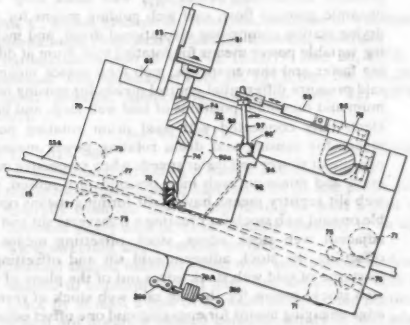
ROCKER PRESS WITH SQUEEGEE AND WEB FEED MEANS

James A. Black, 13700 Sparta Ave., Kent City, Mich. 49330

Filed Oct. 3, 1974, Ser. No. 511,784

Int. Cl.[2] B41F *15/08, 15/24*

U.S. Cl. 101—124 **2 Claims**



1. A web stock stencil printer having a curved, stock support bed, a stencil screen frame support rockable on said bed, and print carriage means for rocking said stencil screen frame support on said stock support bed, said print carriage means being reciprocally movable in a print stroke and in a return stroke along said bed, said print carriage means being operably coupled to said frame support to rock said frame support over said bed in a first direction during the print stroke, and rock it in the opposite direction during the return stroke; said bed having a web stock inlet end, and a web stock outfeed end; means to intermittently shift said bed and said stencil screen frame support apart after the print stroke for enabling web stock to be advanced around said curved bed free from interference with a stencil and stencil frame in said stencil frame support; a squeegee shiftable on said carriage means between a print position and a non print position relative to said frame support and said bed; shifting means connected to said squeegee for shifting said squeegee from said print position to said non print position; a squeegee trailing flow coater means spaced from said squeegee for spreading a coating of ink on the stencil in said stencil support frame, and end panels extending between said squeegee and said flow coater means, to cause said squeegee, flow coater means, and end panels to form an open bottom ink reservoir; said squeegee having a front face and openings from said front face, through said squeegee and into said reservoir, to allow excess ink in front of said squeegee to flow back into said reservoir.

2. A web stock stencil printer having a curved stock support bed, a stencil screen frame support rockable on said bed, and print carriage means for rocking said stencil screen frame support on said stock support bed, said print carriage means being reciprocally movable in a print stroke and in a return stroke along said bed, said print carriage means being operably coupled to said frame support to rock said frame support over said bed in a first direction during a print stroke, and rock it in the opposite direction during a return stroke; intermittent web stock advancing means adjacent said bed for advancing the web stock; web registry means for registration of the web stock; said bed being shiftable relatively toward said frame support for the print stroke and away from said frame support for the return stroke and web stock advancement; a squeegee supported by said print carriage means to travel therewith; said squeegee being shiftable between a lowered print position during the print stroke and an elevated position during the return stroke; said bed having web infeed end and a printed web outfeed end; said web stock advancing means comprising a series of powered vacuum belt units at said outfeed end in parallel relationship to each other; said vacuum belt units being interconnected on shiftable parallelogram linkage to regulate angular directional web stock movement relative to said bed during advancement of the web stock over the bed, one leg of said linkage comprising a series of universal joints to enable said vacuum belt units to remain in parallel relationship.

3,973,491

FLOOD COATER AND SQUEEGEE WITH VISCOSITY SENSING AND CONTROL

Frank L. Porth, Morley; James A. Black, Kent City, and Harry Russell Farwell, Cedar Springs, all of Mich., assignors to James A. Black, Kent City, Mich.

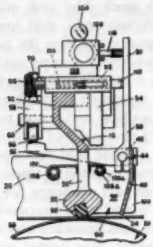
Filed Oct. 29, 1974, Ser. No. 518,768

Int. Cl.[2] B41F *15/46;* **G05D** *11/12*

U.S. Cl. 101—124 **11 Claims**

10. Coating apparatus comprising: means for supporting stock to be coated; means for supporting a screen above said stock supporting means; fluid supply means for supplying fluid onto said screen; a squeegee for forcing fluid on the screen, down through the screen onto stock on said stock supporting means; viscosity sensing means positioned to extend adjacent the screen for sensing the viscosity of the fluid as it is coated on said screen; and viscosity control means responsive to said viscosity sensing means for varying the fluid viscosity in said fluid supply means; recycle passage means through said squeegee to recycle excess ink on the screen ahead of the squeegee back into said fluid supply means; said viscosity sensing means

comprising means for engaging the fluid as it is being coated on the screen, and movable with said squeegee; said fluid engaging, viscosity sensing means being biased to one position and being shiftable against the bias in response to increase in



fluid viscosity, to controllably actuate said viscosity control means; said sensing means comprising a flow coater spaced from said squeegee to define a fluid reservoir therebetween, and slightly elevated relative to said squeegee, thereby forming said fluid supply means.

3,973,492

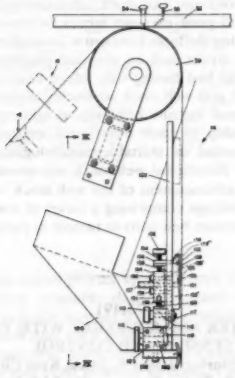
WEB SLIT REGISTRY

James A. Black, Kent City, and Harry Russell Farwell, Cedar Springs, both of Mich., assignors to James A. Black, Kent City, Mich.

Filed Oct. 31, 1974, Ser. No. 519,591

Int. Cl.² B41F *15/24*; B65H *23/00*

U.S. Cl. 101—126 **8 Claims**



8. A combination slit registry and stencilling apparatus enabling resgistry of a portion of web stock to be stencilled by action on a portion of web stock just previously stencilled, comprising:

web stock advancing means for advancing web stock through said apparatus;

a stencilling station with stencil coating apparatus thereat;

slit forming means upstream of said stencilling station, relative to the web stock advancement direction for creating a slit transverse to the direction of stock advance and two adjacent edges;

offsetting means downstream of said stencilling station for offsetting the web stock adjacent the slit and at least one of the formed web edges, out of the plane of the web stock;

web reversing pulling means for shifting the web stock in reverse; and

edge engaging means downstream of said stencilling station, for engaging the offset web edge of a previously stencilled web portion with said reverse shifting of the web stock, for registry of the web stock portion about to be stencilled; said offsetting means comprising a configurated recess and cooperative, gaseous pressure differential, web depressing means for depressing the web stock into said configurated recess.

3,973,493

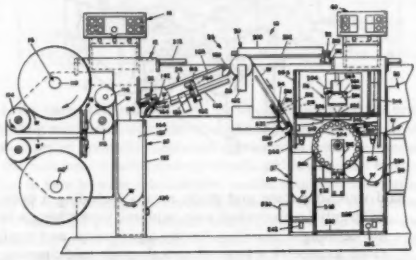
WEB STENCILLING AND DRYING APPARATUS

James A. Black, Kent City, and Harry Russell Farwell, Cedar Springs, both of Mich., assignors to James A. Black, Kent City, Mich.

Filed Nov. 1, 1974, Ser. No. 519,822

Int. Cl.² B41F *15/24*; B65H *23/00*; F26B *13/10*

U.S. Cl. 101—126 **3 Claims**



1. Stencilling apparatus for web stock comprising:

at least one stencilling station including means for stencilling web stock;

web slit registry means for repeatedly registering web stock portions at said stencilling station;

a drying station downstream of said stencilling station and downstream of said web slit registry means, including web guiding means for guiding said web stock therethrough; and

pressure differential control means downstream of said stencilling station and of said web slit registry means, and upstream of said drying station for receiving and retaining a loop of said web stock between said stencilling station and said drying station, including means for applying a pressure differential across said web stock loop with dynamic gaseous flow; said web guiding means for said drying station comprising a rotational drum, and including variable power means for rotating said drum at differing faster and slower speeds; web loop sensor means at said pressure differential control means for sensing maximum and minimum positions of said web loop, and being electrically connected with said drum rotating power means for causing said drum rotating power means to operate at slower and faster speeds when respective maximum and minimum web loop positions are sensed; said web slit registry means having slit forming means operable on said web stock for creating a transverse slit and two adjacent web stock edges, stock offsetting means for offsetting the stock adjacent said slit and offsetting at least one of said web stock edges out of the plane of said web stock; means for shifting said web stock in reverse; edge engaging means for engaging said one offset edge for registry of said web stock when said web stock is shifted in reverse; said offsetting means comprising means for forming a gaseous pressure differential across said web stock adjacent said slit.

3,973,494
HAND PRINTING STAMP

Howard J. Morrison, Deerfield; Alan Hicks, Wilmette, and Wayne A. Kuna, Oak Park, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Dec. 20, 1974, Ser. No. 534,845
Int. Cl.² B41K *1/08*
U.S. Cl. 101—373 1 Claim

1. A hand printing stamp, comprising:

a base having a handle on one side thereof and image forming means movably mounted on the opposite side thereof for hand stamping onto an appropriate surface, said image forming means comprising a plurality of coplanar relatively movable stamping portions in the form of a figure including a central torso portion mounted on said base and spaced therefrom, a head portion rotatably mounted on the base by pivot means spaced from said torso portion and maintaining the head portion coplanar with the torso portion, a pair of arm portions rotatably mounted on the base by pivot means located adjacent said torso portion so as to be rotatable relative thereto in arcs emanating therefrom with the arm portions coplanar with the torso portion, a pair of leg portions rotatably mounted on the base by pivot means located generally centrally of and behind said torso portion so that the entire leg portions are pivotable bodily relative to the torso portion in peripheral arcs so as to provide for multiple images of articulated positions of the figure, said leg portions each including an image forming portion spaced from said base but coplanar with said torso portion and an offset extension portion protruding beneath said torso portion to the pivot means for the leg portions, backing support ribs on said base and protruding outwardly from the base in the path of movement of the image portions for engagement with and maintaining the image forming portions of said leg portions coplanar with that of the torso portion, and said pivot means for said leg portions being provided by a common pivot pin connected to said torso portion and extending between the torso portion and said base.

3,973,495
HAND STAMP

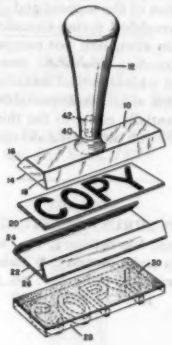
Archie C. Rowe, Melbourne, Australia, assignor to Vuestamp International Proprietary Limited, Keswick, Australia

Continuation-in-part of Ser. No. 102,019, Dec. 28, 1970, abandoned. This application Feb. 28, 1973, Ser. No. 336,506
Claims priority, application Australia, July 31, 1970, 2044/70
Int. Cl.² B41K *1/56*
U.S. Cl. 101—405 4 Claims

1. A hand stamp including a handle and comprising:

a transparent quadrilateral base secured to and protruding laterally from the handle and having at least a pair of opposed edges with portions slanting inwardly in an upward direction and a bottom surface,

a channel shaped member fitted over said bottom surface, shaped to conform to said base, and detachably held in place by at least a pair of opposed sides having portions which are inwardly slanted complementary to said edge portions and engage the same to define a display space between the bottom surface of the base and interior of the channel shaped member, an impression block secured to the outer surface of the channel shaped member and usually planar when said channel shaped member engages said base, said display space being viewable through said transparent base to hold a proof plate bearing an imprint of said impression block in substantial registration with

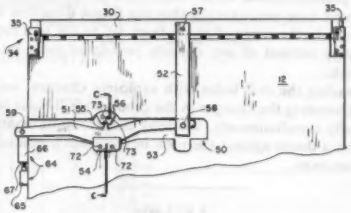


said impression block, the channel shaped member being formed from a resilient material so that such member can be snapped over said opposed edges of the base to be engaged therewith by said sides.

3,973,496
APPARATUS FOR MOUNTING AND LOCKING PRINTING PLATES

Daryl D. Cerny, Greenville, Ohio; Robert W. Cannon, Muncie, Ind.; Robert E. Okeley, II, Yorktown, Ind., and Joseph L. Sannella, Muncie, Ind., assignors to Ball Corporation, Muncie, Ind.

Division of Ser. No. 410,580, Oct. 29, 1973, which is a continuation of Ser. No. 272,604, July 17, 1972, abandoned. This application Sept. 17, 1975, Ser. No. 614,037
Int. Cl.² B41F *27/14*
U.S. Cl. 101—415.1 5 Claims



1. A means for securing a printing plate to a cylinder comprising: an arcuately-shaped support member fixedly disposed on said cylinder, said support member having a leading transverse edge and a lagging transverse edge parallel to the longitudinal axis of said cylinder, said cylinder having an outer circumferential surface; a projecting edge along said lagging edge forming a cavity bounded by said projecting edge and said circumferential surface; a plurality of springs positioned along said lagging edge within said cavity; a spring-mounted rectangular bar disposed within said cavity along the entire length of said projecting edge and against said circumferential surface and said support member, said bar being operably and non-detachably connected in a slideable relationship to said support member by said springs and operably connected in a slideable relationship to said cyliner by said sprins; arcuately shaped plate-anchoring means provided by a groove running along the entire length of said bar parallel to said lagging edge.

said plate-anchoring means being adapted to receive and engage said printing plate in mating relationship whereby a printing plate may be selectively positioned on and attached to said cylinder; and retaining and guiding means comprising a slotted clip mounted beneath the lagging lateral edges of a modified body portion of the support and extending under the lateral edges of a modified spring-mounted bar wherein the slot in said clip is an elongated slot competent to receive an arresting means extending downward thereinto and to oscillate therealong and whereinn said modification comprises a reduction in thickness of said body portion and said bar at said lateral edges substantially equal to the thickness of said clip, and further comprises an incorporation of an arresting means in said bar.

3,973,497

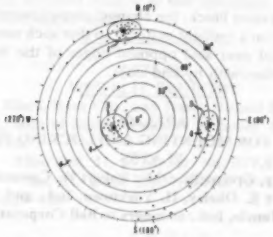
DIRECTED-THRUST BLASTING PROCESS

David Linn Coursen, Mercersburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 24, 1974, Ser. No. 508,888

Int. Cl.² F42D *3/00*

U.S. Cl. 102—23 **17 Claims**



1. A method of generating a directed thrust in rock comprising:

a. forming in the rock a group of adjacent drill holes which lie substantially in a common plane whose normal defines a predetermined thrust direction, said plane being oriented in a manner such that the thrust direction is at an angle in the range of about from 40° to 80° to a representative normal of any densely populated joint set in the rock;

b. loading the drill holes with explosive charges; and

c. detonating the charges in the group of drill holes substantially simultaneously, whereby the group-detonation exerts a thrust against the rock in the predetermined thrust direction.

3,973,498

INITIATION DEVICE FOR EXPLOSIVE CHARGE

Ingemar Per Persson, Huddinge, Sweden, assignor to Nitro-Nobel A.B., Gyttorp, Sweden

Filed May 22, 1974, Ser. No. 472,102

Claims priority, application Sweden, May 28, 1973, 7307463

Int. Cl.² F42B *1/00*

U.S. Cl. 102—24 R **3 Claims**

1. A spot welding device for spot welding metal parts by explosive force, said device comprising:

a rigid tubular member open at both ends; a rigid first plug tightly fitted into one end of said tubular member; a rigid second plug tightly fitted into said tubular member axially spaced from said first plug, said plugs defining therebetween a transversely elongate closed space of generally conical shape, the apex of said space facing the first plug; explosive material in said conically shaped space; a detonator for detonating said explosive material disposed in the tubular member on the side of the second plug facing the other plug; ignition means at said other end of the tubular member and coacting with said detonator so as to activate the same upon activation of the ignition means, thereby causing explosion of the explosive material, the axial thicknesses of the plugs and the location of said

space being so correlated that the major portion of an explosive force generated upon explosion of the explosive material acts upon the first plug, thereby causing a spot weld of generally annular configuration when the said one end of the tubular member is placed upon metal parts to be spot welded.

3,973,499

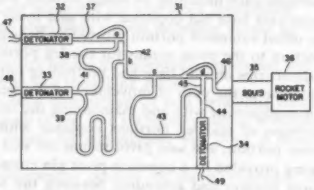
SAFE ROCKET MOTOR IGNITER USING SEQUENCED INITIATION TO AN EXPLOSIVE LOGIC NETWORK

Matthew E. Anderson, China Lake, and Fredric L. Menz, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 27, 1974, Ser. No. 501,101

Int. Cl.² F42C *19/08*

U.S. Cl. 102—70 R **2 Claims**



1. A safing apparatus for use in fail safing a squib used to fire a rocket motor comprising:

a support plate of inert material having first and second continuous uniform explosive trails formed thereon;

first and second electrically actuated igniting means attached to said first and second explosive trails respectively;

said first explosive trail branching at an angle of 30 degrees or less into a curved branch and a straight branch with said curved branch meeting said straight branch in a first right angled junction at their extremities to form a single first output explosive trail;

said second explosive trail branching into a first and second time delay means with said first time delay means meeting at its extremity said first explosive trail straight branch to form a second right angled junction;

said second time delay means having a substantially longer time delay than said first time delay means and meeting at its extremity said first output explosive trail to form a third right angled junction;

transfer charge means attached to said first output explosive trail and to a squib for firing said squib upon the arrival of a detonation wave at said transfer charge;

said safing apparatus operative to provide said detonation wave along said first output explosive trail only when said

first and second ignition means are electrically actuated in a predetermined time sequence.

3,973,500

ELECTROMAGNETIC GENERATOR FOR PROJECTILES

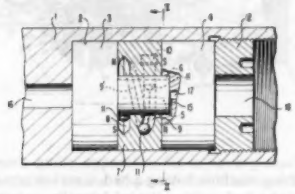
Uwe Brede, Schwaig, and Heinz Gawlick, Furth, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Oct. 24, 1974, Ser. No. 517,625

Claims priority, application Germany, Nov. 3, 1973, 2355107

Int. Cl.² F42C 11/04

U.S. Cl. 102—70.2 G 16 Claims



1. An electromagnetic generator for a projectile comprising a magnetic core, a coil system, a race duct, element means movable in said race duct relative to said magnetic core for locally altering the magnetic field, and ignitable charge means for generating propellant gases which propellant gases cause at least initial movement of said element means in said race duct.

3,973,501

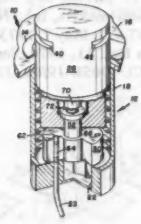
FUZE WITH DUAL SAFE POSITIONS AND ARMED-SAFE INDICATOR

George S. Briggs, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 322,825, Jan. 11, 1973, abandoned. This application Sept. 17, 1974, Ser. No. 506,677

Int. Cl.² F42C 5/00

U.S. Cl. 102—81 17 Claims



1. A safety and arming device for an ordnance fuze comprising:

a housing receivable within the fuze and longitudinally movable from a first position flush with the top surface of the fuze to a second position protruding above the fuze;

an arming rotor rotatably supported on the bottom of and longitudinally movable with said housing;

motive means within said housing to control rotation of said rotor into an armed position only when said rotor is in said second position;

spring means urging said housing and said arming rotor out of said position to said second position;

releasable restraining means for maintaining said rotor and said housing in said first position; and

an electro-responsive explosive device positioned in said arming rotor and forming a part of an explosive arming train in the fuze,

said rotor being normally held in the safe position with said housing being flush with the fuze and said explosive device being axially and rotationally out-of-line with the explosive arming train.

3,973,502

TUBE PRIMER

Charles R. Olsen, 307 Conestoga Way, Suite 37, Eaglesville, Pa. 19408

Filed July 12, 1974, Ser. No. 487,896

Int. Cl.² F42C 19/10

U.S. Cl. 102—86.5 2 Claims

1. A tube primer comprising:

a deformable metal tube having an indented portion defining a longitudinally extending, convexly-shaped anvil integrally formed in the wall of the tube and in the interior volume thereof;

a percussion-ignitable primer mixture contained in the indented portion of the tube such that the wall of the tube opposite the anvil may be deformed to crush and thereby ignite and deflagrate the primer mixture.

3,973,503

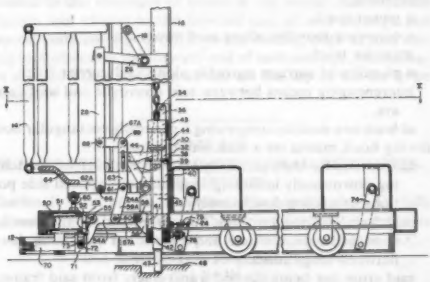
TOW CART SAFETY MECHANISM

Bruce W. Parker; Jim H. Morrison, and Arliss B. Noble, all of Norman, Okla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 21, 1975, Ser. No. 551,940

Int. Cl.² B61B 13/12

U.S. Cl. 104—172 BT 10 Claims



1. In a tow cart driven by conveyor drive means, a driving and release arrangement comprising:

drive pin means carried by said cart and having one end portion adapted to be engaged by said conveyor drive means;

means supporting said drive pin means for axial movement placing said one end portion into and out of engagement with said conveyor drive means;

a stored force means and an overcenter toggle mechanism associated therewith, said overcenter toggle mechanism

having a cocked position and an alternate released position, said stored force means and said toggle mechanism restraining forward movement of said one end portion relative to said cart in said cocked position, and releasing said forward restraint to permit said one end portion to move freely away from said drive means and substantially simultaneously exerting a force to move said one end portion axially out of engagement with said drive means upon release of said stored force means; and

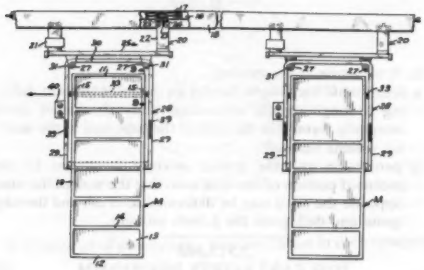
means for moving said stored force means and toggle mechanism from said cocked position to said released position in response to a predetermined degree of obstruction to the forward movement of said cart.

3,973,504

POWER AND FREE CONVEYOR SYSTEM

Kenneth F. Knudsen, St. Clair Shores, Mich., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed Feb. 24, 1975, Ser. No. 552,533
Int. Cl.² B61B *13/12*
U.S. Cl. 104—172 S **18 Claims**



1. In a power and free conveyor system, the combination comprising

a power track,

a conveyor movable along said power track,

a carrier track,

a plurality of carriers movable along said carrier track,

interengaging means between said conveyor and said carriers,

at least one module comprising a generally rectangular body having hook means on a rear wall thereof,

said carrier having a generally vertical central frame extending downwardly including longitudinally spaced side portions extending downwardly,

said frame having portions thereof extending transversely from said central frame and a cross bar extending therebetween longitudinally of said carrier,

said cross bar being spaced transversely from said frame,

said carrier having the space between said side portions unobstructed to receive said module,

said module extending between said side portions of said frame with said hook means engaging said cross bar,

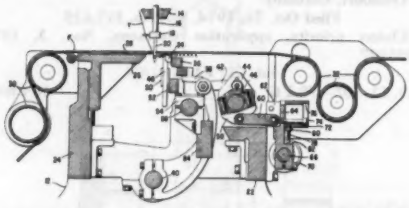
said carrier having additional portions thereof extending transversely from said frame spaced vertically below said cross bar and having contact means thereon engaging said rear wall of said module having said hook means thereon to stabilize said module such that said module is supported and stabilized solely by said cross bar and said contact means.

3,973,505

TUFTING MACHINES

Richard J. Prichard, Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,720
Int. Cl.² D05C *15/08*
U.S. Cl. 112—79 R **5 Claims**



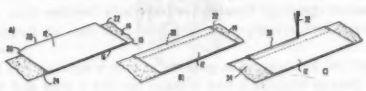
1. In a tufting machine having a bed, a rocker arm pivotably mounted in the bed, a plurality of laterally spaced loopers each adapted to seize a loop of yarn presented thereto, means for securing said loopers to the rocker arm, a laterally extending oscillating shaft mounted in the bed, a rocker member secured to said shaft, and means pivotably connected to said rocker arm and said rocker member for oscillating said rocker arm and thereby said loopers in a plane substantially normal to said shaft, the improvement comprising: a second rocker member secured to said shaft for movement in said plane in a direction opposite to that of said loopers, a second rocker arm pivotably mounted in said bed for movement in said plane, a counter-balancing weight secured to said second rocker arm, and connecting means pivotably connected to said second rocker member and to said second rocker arm for oscillating said weight in a direction opposite to that of the loopers.

3,973,506

METHOD AND APPARATUS FOR MAKING SHIRT CUFFS

Elwood Rinehimer, Wapwallopen; Donald M. Walters, Lehighton, and Kenneth L. Jarrett, Sr., Mertztown, all of Pa., assignors to Eagle Shirtmakers, Inc., New York, N.Y.

Division of Ser. No. 357,827, May 7, 1973, Pat. No. 3,884,166.
This application Dec. 11, 1974, Ser. No. 531,803
Int. Cl.² D05B *19/00*, *37/04*
U.S. Cl. 112—130 **11 Claims**



1. A method of cutting a strip having individual pieces of clothing material secured thereto with the end edges of the pieces in predetermined spaced relation to each other along the length of the strip comprising, the steps of

feeding the strip toward a cutter;

sensing the location of an end of a piece of clothing material on the strip;

stopping the strip in response to the sensing, with an end of the clothing piece in a predetermined position relative to the cutter;

maintaining the strip stopped while operating the cutter to cut the strip adjacent an end of the clothing piece;

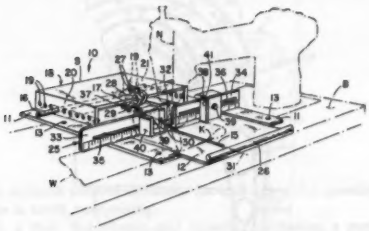
conveying the severed piece of the strip out of the path of travel of the strip before resuming feeding of the strip.

3,973,507

WORK GUIDE APPARATUS FOR A SEWING MACHINE

Joseph P. Sambus, 1079 Mosefan St., Franklin Square, N.Y. 11010

Filed June 16, 1975, Ser. No. 586,882
Int. Cl.[2] D05B 35/12
U.S. Cl. 112—136 12 Claims



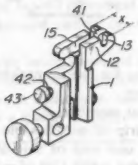
1. A work guide apparatus for a sewing machine which comprises guide means disposed for attachment to a base surface of the sewing machine, a plate moveable in guided engagement with said guide means over said base surface to carry a work piece along a corresponding path of motion with respect to the needle path of the sewing machine, adjustable stop means operable to limit the movement of said plate at a selected position along the movement path thereof to correspondingly limit the stitching length effected by the sewing machine needle, and gauge means extending across said plate to accommodate positioning portions of the work piece in a selected spatial relation to a reference line on the plate to thereby control the location of the stitching effected by said needle.

3,973,508

SEWING MACHINE ZIPPER FOOT

Yasukata Eguchi, Kunitachi, and Susumu Hanyu, Hachioji, both of Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed Dec. 9, 1974, Ser. No. 531,007
Claims priority, application Japan, Dec. 11, 1973, 48-140595[U]
Int. Cl.[2] D05B 29/00
U.S. Cl. 112—240 4 Claims



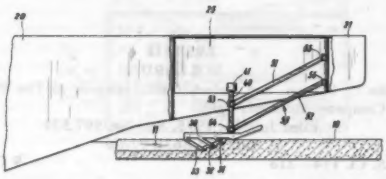
1. In a sewing machine having a vertically oriented presser bar, a combination comprising a supporting member adapted to be mounted on said presser bar and having an end portion provided with an upright groove and with another groove extending transversely of said orientation; a zipper foot having a shaft also extending transversely of said orientation and receivable in said groove; connecting means adjustably connecting said zipper foot with said supporting member, said zipper foot having a base plate provided on an upper side thereof with a pair of transversely spaced sidewalls, and said shaft extending from one to the other of said sidewalls, the distance between said sidewalls being greater than the corresponding dimension of said end portion so that the latter is receivable with clearance between said sidewalls; and adjusting means for adjustment of said zipper foot relative to said free portion in direction axially of said shaft between at least two positions, including at least two spaced upright projections fixedly arranged on said upper side of said base plate and alternatively receivable in said another groove.

3,973,509

ICEBREAKER VESSEL

Heinrich Waas, Bramfelder Strasse 164, 2 Hamburg 33, Germany

Filed July 15, 1974, Ser. No. 488,709
Claims priority, application Germany, Aug. 20, 1973, 2341932; June 8, 1974, 2427695
Int. Cl.[2] B63B 35/08
U.S. Cl. 114—42 12 Claims



1. An icebreaker vessel having a hull including a forecastle, marine propulsion means mounted in said hull, and means for breaking ice as the vessel travels along, said means for breaking ice comprising a slidable carriage mounted on the forecastle of said hull and having a forward end facing in the direction of travel of the vessel and rearward end spaced in a direction of travel rearwardly from the forward end, a plurality of planing tools secured to and projecting downwardly from said carriage and extending from said carriage in the direction of travel of the vessel so that said planing tools are disposed at an angle to said carriage, each of said planing tools having a cutting edge, said planing tools being spaced apart in the direction of travel of the vessel and defining therebetween cavities, the cutting edge of said planing tools arranged in a step-like manner with the downward dimension of the cutting edge of each said planing tool from said carriage increasing from said planing tool closest to the forward end of said carriage to said planing tool most remote from the forward end of said carriage, and said carriage having a deflector surface located in the direction of travel of the vessel ahead of said planing tool closest to the forward end of said carriage and spaced vertically upwardly from the cutting edge of said cutting tool closest to the forward end of said carriage, the deflector surface being arranged to rest on the top of the ice to be broken.

3,973,510

SUBMERSIBLE OBJECT HAVING DRAG REDUCTION AND METHOD

Charles R. McCulloch, Shalimar, Fla., and Robert C. Gill, Pomfret, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 9, 1974, Ser. No. 504,636
Int. Cl.[2] B63B 1/34
U.S. Cl. 114—67 A 6 Claims

1. A submersible object having a polymeric drag reducing coating on the water contacting surface of the submersible object, wherein the improvement comprises the incorporation in said polymeric coating of at least 50% by weight of hydrophobic silica in order to produce a nonuniform coating on the submersible object.

3. A method of reducing drag on a submersible object which comprises coating the water contacting surface of the object with an uncured, tacky binding agent selected from the group consisting of an epoxy resin, a polyether resin, a polyester

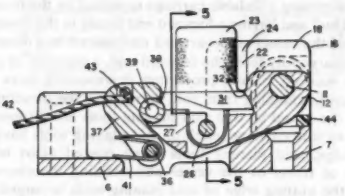
resin, a polyurethane resin, a polyhydrocarbon resin, a polyperfluorinated hydrocarbon resin, a polysiloxane resin and mixtures thereof, applying a coating of hydrophobic silica to said tacky binding agent; and curing said tacky binding agent, the binding agent causing the hydrophobic silica to adhere firmly to said object, thus providing said object with a nonuniform coating.

4. A method of reducing drag on a submersible object which comprises blending hydrophobic silica with an uncured binding agent selected from the group consisting of an epoxy resin, a polyether resin, a polyester resin, a polyurethane resin, a polyhydrocarbon resin, a polyperfluorinated hydrocarbon resin, a polysiloxane resin, and mixtures thereof to form a coating material containing at least 50% hydrophobic silica by weight; applying said coating material to the water contacting surface of said object; and curing said coating material, thus providing said object with a nonuniform coating.

3,973,511
BOLLARD

John C. Balston, San Rafael, Calif., assignor to The Rucker Company, Oakland, Calif.

Filed July 21, 1975, Ser. No. 597,539
Int. Cl.² B63B 21/06
U.S. Cl. 114—218 **9 Claims**



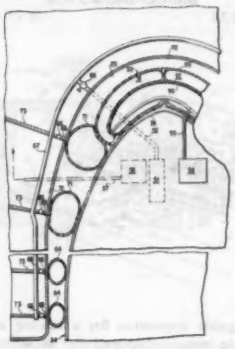
1. A bollard comprising a base, a release lever, first means for pivoting said release lever on said base, a bollard drum, second means for pivoting said bollard drum on said release lever, and releasable means for securing said release lever to said base.

3,973,512
SHIP CONNECTING STRUCTURE

Willard F. Fahrner, 251 Florence St., SW., Aiken, S.C. 29801

Division of Ser. No. 302,543, Oct. 31, 1972, Pat. No. 3,820,258. This application June 27, 1974, Ser. No. 483,713
Int. Cl.² B63B 21/56
U.S. Cl. 114—235 R **36 Claims**

20. A coupling combination between a first vessel and a second vessel which comprises supply means for supplying fluid under pressure, an expansible member composed of a resilient rubber-like material which is firmly attached to said first vessel, conduit means, said expansible member being connected to said supply means by said conduit means, control means operatively associated with said conduit means whereby said expansible means may be selectively and progressively expanded in response to said control means, and slot means defined in said second vessel adapted to receive said expansible member before it is expanded, said expansible member being sufficiently expansible, in response to said control means, in said slot means to dampen relative motion between said vessels in a tongue and groove type interlocking engagement, said slot means in said second vessel being defined by at least a pair of additional, spaced expansible members comprised of rubber-like material.



3,973,513
DROP MARKER

Maurice K. Huwe, Box 583, Waitsburg, Wash. 99361

Filed July 7, 1975, Ser. No. 593,769
Int. Cl.² G08G 5/00
U.S. Cl. 116—124 B **7 Claims**

1. A drop marker for use in marking ground areas from an airplane comprising:

A. a flexible base member,

B. a streamer strip of soft flexible material having a large surface area, one end of said strip affixed to the base member and the other end of said strip being free,

C. said folded streamer strip lying wholly within the border of the base member to provide exposed edge portions on said base member and thereby facilitate separation of one member from a stack of markers,

D. holes within said base member relatively near the edge portions of the base,

E. a reinforcing plate attached to the base member at an exposed edge portion to stiffen said base member at said portion and to cause an unbalance in the weight distribution of the base; and

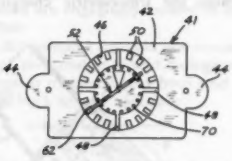
F. whereby when the marker is dropped from a plane, the unbalance of the base induces a tumbling action on the marker and air passing through the holes contacts the streamer strip and causes it to unfold and stream behind the base member.

3,973,514

STOCK CONTROL INDICATING MEANS

John L. Patrick, 215 S. 29th St., Tacoma, Wash. 98402

Filed Feb. 24, 1975, Ser. No. 552,058
Int. Cl.² G09F 9/00
U.S. Cl. 116—133 2 Claims



1. A stock control indicator for indicating the quantity of an item is stock comprising

1. a thin, flat plastic dial member including a peripheral portion and hub defining a circular opening therebetween, said dial member further including a first plurality of equally spaced-apart radial members connecting said peripheral portion and said hub and dividing said opening into equal quadrants, additional radial members connected to the peripheral portion and extending partially across said opening between said first radial members for delineating subdivisions of said quadrants, said hub defining a central opening and a substantially larger open sector which communicate via a channel of a width less than the diameter of said central opening, said hub having a plurality of integral humps spaced-apart in a circular array concentric with said central opening, the number of humps being equal to the number of radial members; and

2. a plastic rotary indicating member extending trasnversely to said dial member and including an operating portion adapted to be grasped by a user to effect rotation thereof, an edge of said operating portion engaging and clicking over said humps when said indicating member is rotated and being contained between two adjacent humps when stationary, said indicating member having a pointer extending at least partially across said circular opening, said indicating member further including an anchoring head of a diameter larger than said central opening, said head being insertable through said open sector and being connected to the operating portion by a narrow neck portion, said neck portion being confined in said central opening and being of a thickness slightly greater than said channel such that it may be forced from said open sector through said channel and into the central opening for confinement therein;

the humps on said hub being disposed between the longitudinal axes of adjacent radial members such that when said indicating member is stationary, said pointer is substantially aligned with a radial member.

3,973,515

TABLET BINDING MACHINE

John DeMand, Topeka, Kans., assignor to Wilson Jones Company, Chicago, Ill.

Filed Aug. 19, 1975, Ser. No. 605,851
Int. Cl.² B05C 1/02, 13/02
U.S. Cl. 118—202 20 Claims

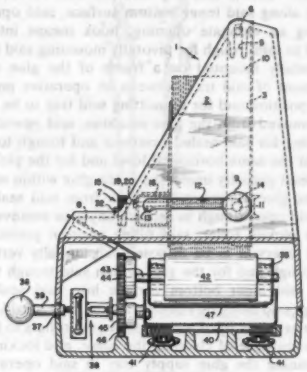
1. An apparatus for binding sheets of paper in a stack along one edge of the stack comprising:

a. an applicator for applying adhesive to said one edge;

b. a back plate against which the sheets are clamped and held in the clamped position while the adhesive is applied, and

c. a clamp means to hold the sheets together with sufficient compression for maintaining the sheets in alignment against said back plate including:

i. a rotatable knob moving means for driving said clamp bar toward the back plate adjacent said sheets and for causing said clamp bar to be pressed against said sheets with sufficient pressure to maintain the sheets in alignment,



ii. a release means for disengaging the clamp bar from the sheets allowing the sheets to be withdrawn from the binding machine, and

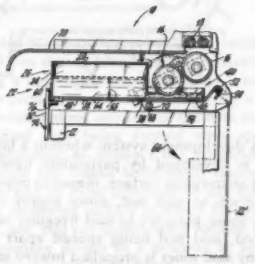
iii. a holding means for holding the clamp bar in the clamped position until said clamp bar is released by said release means.

3,973,516

DISPENSING TRAY FOR GLUE MACHINE

Julius M. Minkow, 69 Washington St., Brooklyn, N.Y. 11201

Filed Jan. 14, 1975, Ser. No. 540,801
Int. Cl.² B05C 1/08
U.S. Cl. 118—262 6 Claims



1. A glue supply tray for supplying glue to a glue machine generally of the type having a pickup roller at least partially immersible in a supply of glue, said glue supply tray comprising a substantially sealed reservoir and an adjacent open trough, a bottom wall of said trough extending from a bottom wall of said reservoir to provide a continuous inner bottom surface therewith, one side wall of said trough extending from one side of said reservoir to provide one continuous inner side surface, an opposite side wall of said trough extending from an opposite side wall of said reservoir to provide a continuous opposite inner side surface, said reservoir having opposite end walls and a top wall to provide a sealed enclosure with one of said end walls being disposed adjacent to said trough, said trough having an end wall to provide an open receptacle for the glue, said enclosure having a height greater than height of said trough to permit a substantial quantity of glue to be stored

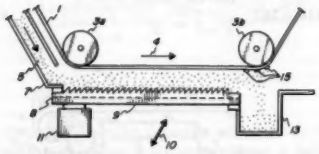
within said enclosure for gradual release of the glue from said reservoir into said trough, an edge of said one end wall of said reservoir being spaced from said inner bottom surface across its width from said one inner side surface to said opposite inner side surface to provide opening means for unrestricted glue flow communication between said reservoir and said trough along said inner bottom surface, said opening means defining an elongate opening, hook means integrally connected to said trough for pivotally mounting said tray on a pin horizontally mounted on a frame of the glue machine for movement of said tray between an operative position and a filling position and for permitting said tray to be mounted on and removed from the glue machine, said operative position providing for said sealed reservoir and trough to be substantially at the same horizontal level and for the pickup roller to be at least partially immersed in the glue within said trough so that the glue is permitted to flow from said sealed reservoir into said open trough to replace any glue removed therefrom by the pickup roller, said filling position providing for said sealed reservoir to be disposed substantially vertically below said trough and for the glue within said trough to flow back along said inner bottom surface into said sealed reservoir through said elongate opening and to permit said sealed reservoir to be easily filled and access to the rollers to be facilitated for the purpose of cleaning the same, and locking means for maintaining the glue supply tray in said operative position during use of the machine and for releasing the glue supply tray to permit the same to pivot to said filling position subsequent to termination of use of the machine.

3,973,517

DEVELOPMENT DEVICE AND METHOD

Frederick W. Hudson, West Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 18, 1975, Ser. No. 550,339
Int. Cl.² G03G *15/08*
U.S. Cl. 118—637 **18 Claims**



1. A development system wherein a latent image on a substrate is developed by particulate toner comprising a bed having an irregular surface, means to impart an angular vibrating motion to said bed, toner supply means positioned to supply toner particles to said irregular surface at one end of said bed, said bed being spaced apart from said substrate whereby said toner is propelled toward said substrate and the other end of said bed, the amplitude of vibration and said bed space between said substrate and bed is adjusted to allow the trajectory of the majority of said toner to approach said substrate without impingement thereon.

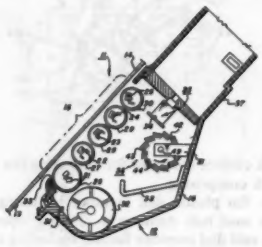
3,973,518

CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE

Stewart W. Volkers, Williamson, and Robert H. Thon, Walworth, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 28, 1975, Ser. No. 572,372
Int. Cl.² G03G *15/08*
U.S. Cl. 118—637 **8 Claims**

1. In a continuous electrostatic processor having a development system for developing latent electrostatic images on the fly as a photosensitive surface bearing said images moves through a development zone; said system including means for circulating a developer having a predetermined angle of repose and containing triboelectrically charged carrier and toner particles along a predetermined path from a sump, through said development zone, and then back to said sump; the improvement comprising a blender for tumbling and cross-mixing the developer to blend the carrier and toner particles and to promote the triboelectric charging thereof; said



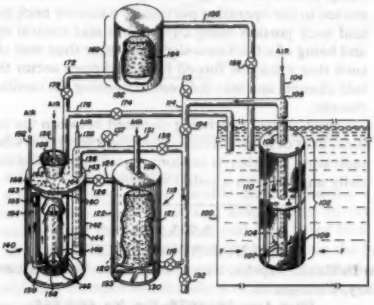
blender including a chamber mounted for rotation about an axis generally parallel to and slightly offset from said path, said chamber having a plurality of axially angulated cross-mixing plates mounted therein and a periphery with a plurality of axially elongated, radially angulated passageways extending therethrough; the radial angulation of said passageways exceeding the angle of repose of said developer, whereby developer introduced into said chamber tends to dwell therein to undergo a tumbling action with an axial component of motion being imparted thereto by said cross-mixing plates.

3,973,519

SCREENING DEVICE IN A CLOSED-LOOP AQUACULTURE SYSTEM

James C. McCarty, San Carlos, and George Monaco, Los Altos, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Oct. 7, 1974, Ser. No. 512,384
Int. Cl.² A01K *63/00*
U.S. Cl. 119—3 **9 Claims**



1. A closed-loop aquaculture system comprising a container;

a screening apparatus located in said container, said apparatus comprising a first plate having a groove extending circumferentially about the edge of said first plate; a second plate parallel to, spaced from, and about the same size as said first plate; a conduit passing through said first plate, the end of said conduit being attached to a face of said second plate, the corresponding edges of said plates

being about the same distance from the outer wall of said conduit, said conduit being apertured along its length;

a flexible, non-toxic, reticulated material extending between the edges of said plates and enclosing said conduit by being snugly fitted about the periphery of said first and second plates and being attached to said first plate by a flexible fastening means engagingly fitting over said material and into said groove so that the material and the fastening means are engagingly located in said groove;

a biological filter;

a pump means for pumping liquid in said container through said apertures and conduit to said biological filter; and

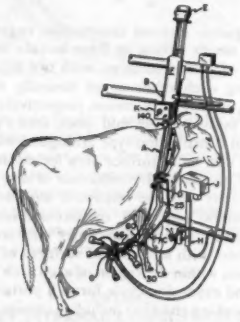
a transfer means to transfer liquid from said container to said filter and back to said container.

3,973,520

AUTOMATED MILKING ASSEMBLY

Andrew J. Flocchini, 7050 Lakeville Highway, Petaluma, Calif. 94952

Filed Sept. 30, 1974, Ser. No. 510,328
Int. Cl.² A01J *5/04*
U.S. Cl. 119—14.08 **7 Claims**



1. An automated milking assembly for moving a claw and teat cup assembly under a cow in a longitudinal milking stall with the head of said cow at one end of said stall and the bag of said cow at another end of said stall, said milking assembly comprising: a vertical arm means, means for supporting and hinging said arm means at its upper end overlying said cow about a substantially horizontal axis disposed substantially transverse of the cow; said arm means carrying and including at its lower end an additional arm hingedly supporting said claw and teat cup assembly; means for reciprocating said vertical arm means upwardly and downwardly away and towards the floor of said milking stall; means for articulating said additional arm to an arcuate disposition from a linear disposition at a location between said hinge and said teat cup assembly whereby said teat cup assembly is supported under the center of said cow in said milking stall adjacent said bag.

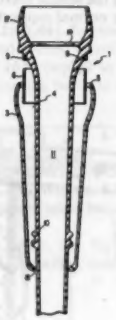
3,973,521

STRETCHED TEAT CUP

Lloyd P. Duncan, 3 Riverbend Place, Washington, Mo. 63090

Continuation-in-part of Ser. No. 449,009, March 7, 1974, abandoned. This application May 12, 1975, Ser. No. 576,248
Int. Cl.² A01J *5/04*
U.S. Cl. 119—14.47 **10 Claims**

1. A teat cup comprising an outer, substantially rigid shell and a inner, elongated flexible inflation, said shell having an upper rim that defines the mouth of said shell and an apertured bottom, a flap of said inflation extending through the mouth and being foldable over said rim to provide a seal, said inflation extending through an aperture adjacent the bottom of said shell to define a resilient bore and leave a sealed pulsator space between the inner surface of the shell and the outer surface of the inflation, spring means positioned around the upper portion of said inflation within said space, said spring means being fitted on said inflation near the upper end thereof



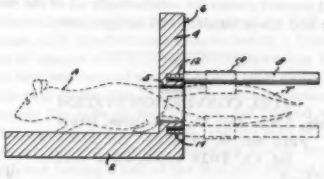
and biasing the teat receiving portion of said bore upwardly and outwardly in a stretched condition during milking operation.

3,973,522

ANIMAL HOLDER FRAME MEANS

Carl Rosow, 66 Dana St., Cambridge, Mass. 02138

Filed May 23, 1975, Ser. No. 580,151
Int. Cl.² A61D *3/00*
U.S. Cl. 119—103 **2 Claims**



1. An animal holder frame for supporting and restraining laboratory mice and rats during laboratory experimentation, said frame including a supporting base section on which an animal may stand or crouch, rack means comprising a vertically disposed wall located along one side of the base section, said vertically disposed wall being formed with aperture means suitable for admitting an animal's tail, perineum and gluteal regions, retainer rod means horizontally disposed at the outer side of the wall in close proximity to the aperture means to provide an anchoring surface to which the animal's tail may be attached, and said rod means being located immediately above the aperture means in a position to hold an animal's tail in dorsally secured relationship.

3,973,523

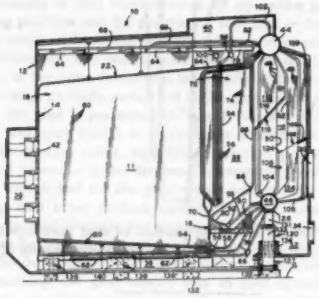
VAPOR GENERATOR

Arthur Keller, Akron, and Neil J. Monroe, Wadsworth, both of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,345
Int. Cl.² F22B *37/24*
U.S. Cl. 122—510 **4 Claims**

1. A bottom supported vapor generating unit comprising walls forming a setting containing pressure parts including horizontally extending upper and lower drums, at least one bank of upwardly oriented tubes connected at their opposite ends to said drums, some of the walls including upright tubes forming sides of a furnace chamber, said upright tubes being connected at their opposite ends to horizontally extending

upper and lower headers, the lower headers being disposed substantially below said lower drum, and means for bottom supporting the lower drum including rigid upright columns at spaced positions along the length thereof, said bottom support means constituting the normal support means for substantially



all of the weight of said drums and tube banks, and means for bottom supporting at least some of the lower headers including resilient means at spaced positions along the length thereof, said last named bottom support means constituting the normal support means for substantially all of the weight of said upper and lower headers and upright tubes.

3,973,524

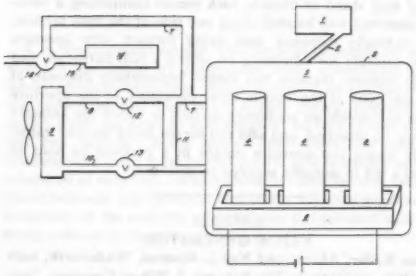
FUEL CONVERSION SYSTEM

David Rubin, 5 Rav Zair St., Jerusalem, Israel

Filed Nov. 4, 1974, Ser. No. 520,378

Int. Cl.² F02B *43/00*; F01P *7/16*

U.S. Cl. 123—3 **9 Claims**



1. In a method of producing mechanical work by burning a fuel in an internal combustion engine by introducing the fuel into the cylinders and igniting the fuel therein, the improvement which comprises circulating a petroleum fraction capable of being cracked into gasoline past the outside of said cylinders in contact with a cracking catalyst to thereby crack the fraction, providing oxygen and hydrogen to the cracked fraction, and thereafter circulating the resulting cracked fraction to the interior of the cylinders.

3,973,525

ROTARY PISTON INTERNAL COMBUSTION ENGINE

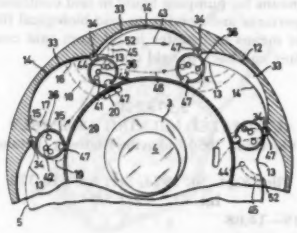
Johann Keylwert, Bensberg, Germany, assignor to Klöckner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Apr. 11, 1975, Ser. No. 567,190

Claims priority, application Germany, Apr. 13, 1974, 2418201

Int. Cl.² F02B *53/08*

U.S. Cl. 123—8.05 **3 Claims**



1. A rotary piston internal combustion engine which includes housing means having its inner surface area provided with a plurality of arched surfaces, each two adjacent arched surfaces meeting each other at an inwardly directed area forming a lobe, sealing strip means respectively arranged in and protruding inwardly from said lobes, rotary piston means of the trochoidal construction type arranged within and rotatable relative to said inner surface area for meshing with said arched surfaces, the outer circumference of said piston means being in conformity with the respective number of cycles of the working method employed, the circumference being divided by a plurality of axis near zones into arches forming working chambers with said arched surfaces of said housing means and means within the region of each arch which during compression and expansion cycle forms a portion of the confinement of a working chamber including change-over conduit means, said piston means having one end face thereof provided with a control opening for controlling said change-over conduit means, fission gas carburetor means arranged in said housing means, conduit systems having mouth openings and communicating with said fission gas carburetor means, said change-over conduit means being operable in response to a rotation of said piston means relative to said housing means so to overlap said mouth openings that the working chamber during the first and second portion of said compression cycle temporarily communicates through said change-over conduit means with said fission carburetor so that during said first portion of said compression cycle fission gas is withdrawn from said fission carburetor and during said second phase of said compression stroke a fission gas-air mixture is conveyed to said fission carburetor.

3,973,526

ROTARY COMBUSTION ENGINE

David G. Kokochak, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.

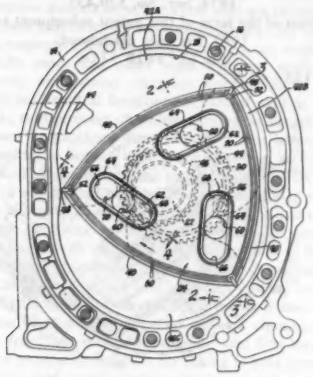
Filed June 16, 1975, Ser. No. 586,903

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.45 **2 Claims**

1. A rotary combustion engine comprising housing means having an internal peripheral wall and oppositely facing side walls, a rotor rotatably mounted in said housing means with sides facing said side walls and flanks facing said peripheral wall with apexes that remain adjacent said peripheral wall as said rotor rotates, said flanks and said walls cooperatively providing a plurality of chambers that are spaced about and move with said rotor while varying in volume, said housing means having an intake port in one of said walls openable by said rotor to said chambers for delivering a combustible gase-

ous mixture to said chambers as they expand in an intake phase, a spark plug mounted on said housing means having a spark electrode located in an opening in one of said side walls so as to always be opposite one of said rotor sides during rotor rotation, an exhaust port located in said one side wall so as to also always be opposite said one rotor side during rotor rotation, and said rotor having separate ignition-exhaust ports



extending from said flanks to said one rotor side in locations so that said spark electrode is opened by said ignition-exhaust ports to ignite the mixture in the respective chambers following their contraction in a compression phase whereupon they expand in an expansion phase and also so that said exhaust port is opened by said ignition-exhaust ports to the respective chambers to expell the exhaust products therefrom as they contract in an exhaust phase.

3,973,527

ROTARY INTERNAL COMBUSTION ENGINE

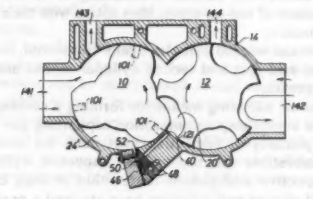
Hans Robert Nilsson, Ektorp, and Roland Pamlin, Handen, both of Sweden, assignors to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed Jan. 30, 1975, Ser. No. 545,600

Claims priority, application United Kingdom, Feb. 1, 1974, 4836/74

Int. Cl.² F02B *53/10*

U.S. Cl. 123—8.47 **13 Claims**



1. A rotary internal combustion engine comprising:

a power rotor (**10**) provided with a number of axially extending lands having flanks of substantially epicycloidal shape,

an abutment rotor (**12**) intermeshing with said power rotor (**10**) and provided with a higher number of axially extending grooves than that of the lands of the power rotor and having concave flanks the outermost portions of which during the intermesh sealingly cooperating with the flanks of the power rotor,

a casing (**14**) carrying and sealingly enclosing said intermeshing power rotor (**10**) and abutment rotor (**12**) and forming together with the flanks of said rotors substantially closed chambers containing air with different pressures, said chambers including a first chamber (**20;20'**) where the air has been partly compressed and a second chamber (**24;24'**) which contains substantially uncompressed air,

channel means (**18,22;40,46**) forming a communication between said first and second chambers, and

fuel injecting means (**16**) coupled to said channel means (**18,22;40,46**) for injecting fuel into said second chamber (**24,24'**).

3,973,528

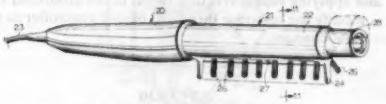
STYLING APPARATUS FOR HAIR

Henry J. Walter, Wilton, and William E. Springer, Stratford, both of Conn., assignors to Clairol Incorporated, New York, N.Y.

Filed Feb. 28, 1975, Ser. No. 554,333

Int. Cl.² A45D *24/00*

U.S. Cl. 132—11 R **7 Claims**



1. Apparatus for treating hair, comprising:

a mandrel having first and second ends, a cavity extending therein and a heat treating surface;

handle means secured to the first end of the mandrel;

mounting means disposed along the periphery of the mandrel;

attachment means detachably retained by said mounting means, said attachment means including a base having a row of spaced relatively rigid teeth extending therefrom, and first and second rows of bristle tufts extending along each side of the row of teeth in spaced relation thereto, wherein the tufts of the first row are aligned with every other space between the teeth, and the tufts of the second row are aligned with the alternate spaces between the teeth not having a tuft of the first row aligned therewith; and

heating means for supplying heat to the surface of the mandrel to heat treat, said heating means being disposed within said cavity of said mandrel.

3,973,529

REDUCING NOXIOUS COMPONENTS FROM THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

Wolf Wessel, Schwieberdingen; Rudolf Schwämmle, Korntal; Hans Schnürle, Walheim, and Heinrich Knapp, Leonberg-Silberberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 18, 1974, Ser. No. 480,582

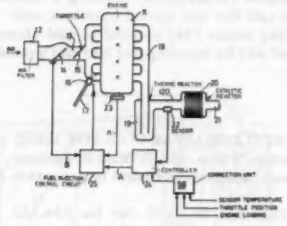
Claims priority, application Germany, July 3, 1974, 2333743

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **23 Claims**

1. In the method of removing noxious components from the exhaust gases of an internal combustion engine, in which the mass ratio of air and fuel (λ) of the air-fuel mixture applied to the engine (**11**) is controlled by a controller (**24**) in dependence on sensed composition of the exhaust gas from the engine, as sensed by a sensor (**22**) located to be sensitive to the exhaust stream of the engine, and providing an output signal which changes in level abruptly upon transition of the exhaust gases between reducing the oxidizing state and wherein the controller is of the threshold response type controlling said mixture as a function of the input from the sensor with respect to a threshold level, the steps of

sensing gas flow of fuel-air mixture through the engine; deriving a correction signal representative of change of level of the output signal of the sensor upon change in gas flow;



and applying said correction signal to the controller (24) to modify the response threshold of said controller as the gas flow changes.

3,973,530

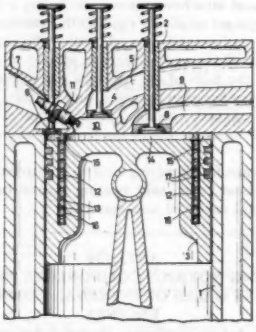
INTERNAL COMBUSTION ENGINE

Hans H. Seidel, Wagnerstr. 9, 8700 Wurzburg, Germany

Filed Dec. 23, 1974, Ser. No. 535,350

Int. Cl.² F02B *19/10, 19/16*

U.S. Cl. 123—32 SP **7 Claims**



1. In an internal combustion engine, the combination comprising a combustion chamber, a head closing one end of said chamber, a piston movable in said chamber toward and away from said head, at least one wall fixed in said chamber at said one end thereof extending longitudinally of piston movement and subdividing the chamber into rich and lean partial chambers, said wall having through holes for directing through passage of fluid between said partial chambers, said head having a head recess opening substantially throughout its extent into said rich partial chamber without appreciable restriction, a rich inlet valve in said head opening through said head recess into said rich partial chamber, a separate lean inlet valve in said head and opening into said lean partial chamber, and ignition means in said rich partial chamber, and said piston having a recess for entry and exit of said wall throughout a considerable extent of piston movement.

3,973,531

ENGINE WITH COMPRESSOR AND BYPASS FOR COMBUSTIBLE MIXTURE

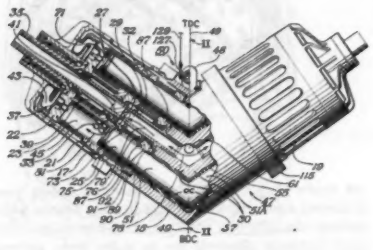
William F. Turner, Graham, Tex., assignor to Turner Research, Inc., Graham, Tex.

Continuation-in-part of Ser. No. 469,216, May 13, 1974, Pat. No. 3,902,468, and a continuation-in-part of Ser. No. 482,154, June 24, 1974, Pat. No. 3,905,338. This application Nov. 4, 1974, Ser. No. 520,435

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² F02B *57/06*

U.S. Cl. 123—43 A **9 Claims**



1. In a rotary internal combustion engine of the so-called angle piston type having:

a. first and second cylinder blocks rotatable about respective central longitudinal axes; said first and second cylinder blocks each having a plurality of radially spaced, substantially parallel cylinders arranged for rotation about respective said central longitudinal axes; the open ends of the respective sets of cylinders being disposed toward each other, aligned, and disposed at an angle with respect to each other so as to form a vee angle α of at least 90° and less than 180°;

b. first and second sets of pistons disposed in respective said cylinders, a pair of aligned pistons in aligned said cylinders being connected together at said vee angle α; each said respective pair of connected pistons being rotatable with and, by angular displacement, reciprocally movable within and with respect to respective cylinders as said pistons are rotated in a generally elliptical path; said pair of connected pistons maintaining their same relative position of top-on-top as they rotate with their respective cylinders;

c. first and second cylinder heads connected, respectively, with said first and second cylinder blocks and rotatable therewith;

d. fuel-air admixing means for forming a combustible mixture comprising a combustion supporting gas and fuel;

e. a plurality of respective inlet ports for intake of said combustible mixture within respective cylinders atop respective said pistons therewithin at least by the time said pistons and cylinders have attained a predetermined first position; said intake ports being connected with and communicating with said cylinders at said first piston;

f. ignition means for igniting said combustible mixture at a predetermined second position; said ignition means being operatively in communication with the interior of said cylinders intermediate a second end of said cylinders and respective said pistons at said second position for firing;

g. a plurality of respective discharge ports for discharging combustion products and waste gases, following firing and combustion of said combustible mixture, from within said cylinder and at a predetermined third position of respective said pistons and cylinders; said discharge ports being connected with and communicating with said cylinders at said third position; and

h. power delivery means connected with said first and second cylinder blocks for delivery of power with respect thereto;

the improvement comprising a center section compressor and bypass combination that allows rapid acceleration and deceleration without damage to elements of said center section compressor because of high vacuum and that includes:

i. a plurality of uniformly shaped members connected with respective pistons in at least one said set of pistons in at least one said block and extending to near the connection with respective aligned pistons at said vee angle α;

j. radially inner and outer walls and end sealing means defining an annular chamber concentrically disposed about said central longitudinal axis of said at least one block; said annular chamber varying in length from its greatest longitudinal dimension at a first location BDC, equivalent to bottom dead center position, to its smallest longitudinal dimension at a second location TDC, equivalent to a top dead center position; said inner and outer walls being disposed immediately adjacent said uniformly shaped members so as to constrain said members to traverse through said annular chamber and in fluid tight relationship therewith so as to effect compression of a fluid between adjacent said members as they move from said first location to said second location and to effect suction of said fluid into said annular chamber as they move from said second location to said first location;

k. center section intake port for taking in said combustible mixture; said center section intake port being in fluid communication with said annular chamber upstream of said first location and with said fuel-air admixing means;

l. center section discharge port for discharging compressed said combustible mixture; said center section discharge port being in fluid communication with said annular chamber adjacent said second location and with said inlet ports;

m. bypass manifold connected in fluid communication with said annular chamber adjacent a third location upstream of TDC and upstream of said first location for bypassing compressed said combustible mixture to the suction side of said compressor thereby diverting a portion of said combustible mixture from said cylinders and alleviating high vacuum and attendant damage to said walls and end sealing means of said center section compressor; and

n. throttle means for controlling the speed and power output; said throttle means including a valve portion within said bypass maanifold and an accelerator portion drivingly operable to effect positioning of said valve portion and operable by an operator so as to position said valve portion as signalled by said operator for fine control of said engine;

whereby said combustible mixture can be taken into said annular chamber of said center section compressor intermediate said members and be compressed as said members having said combustible mixture trapped therebetween move from said first location to said second location and more efficient combustion and less pollution is effected by said bypass manifold and throttle means; and damage to elements of said center section compressor because of said high vacuum is eliminated.

3,973,532

CRANKCASE-SCAVENGED FOUR STROKE ENGINE

Harold Litz, 2285 N. 7th St., North St. Paul, Minn. 55109

Continuation-in-part of Ser. No. 414,396, Nov. 9, 1973, abandoned. This application Oct. 30, 1974, Ser. No. 511,489

Int. Cl.² F01L *9/02*

U.S. Cl. 123—75 CC **3 Claims**

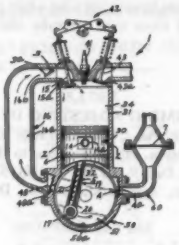
1. Improved internal combustion engine apparatus for driving a power shaft, comprising:

a. a cylinder with a combustion chamber which has controlled intake and exhaust valves;

b. a crankcase positioned adjacent said cylinder and enclosing a crankcase chamber which has a generally cylindrical shape, said crankcase and said cylinder being interconnected to form a generally sealed compression chamber for precompressing combustion air for use in the engine;

c. a crankshaft mounted in said crankcase for rotation, said crankshaft connected to a power shaft and having an exterior surface contour which essentially matches the contour of said crankcase chamber interior surface to reduce the unoccupied volume of said crankcase;

d. a piston slidably and sealably mounted within said cylinder for reciprocal movement, said piston having a top and bottom and serving as a moving barrier between said cylinder combustion chamber and said crankcase chamber, said piston creating an above atmospheric pressure



in said crankcase chamber on its down-stroke and a below atmospheric pressure on its up-stroke;

e. a connecting rod interconnecting said piston and said crankshaft for transmitting the reciprocal movement of said piston to a rotary movement of the crankshaft;

f. a communication chamber communicating with said cylinder intake valve and said crankcase for containing combustion gases which are pressurized above atmospheric pressure in said crankcase chamber by movement of said piston;

g. said crankcase chamber containing:

i. a one-way intake valve positioned between said crankcase chamber and a source of combustion air, said crankcase intake valve openable automatically when the pressure in said crankcase chamber is below atmospheric pressure and closable automatically when said pressure is at or above atomospheric pressure; and

ii. a one-way exhaust valve interrupting the communication between said crankcase chamber and said communication chamber, said crankcase exhaust valve openable automatically when the pressure in said crankcase chamber is above the pressure in said communication chamber and closable automatically when said pressure is at or below the pressure in said communication chamber, said automatic crankcase valves serving to regulate the flow of combustion air to said crankcase in response to the movement of said piston to precompress combustion air for movement to said communication chamber;

h. fuel additive means for adding fuel to the combusion air which enters said cylinder combustion chamber;

i. ignition means for selectively igniting the fuel mixture which is present in said cylinder combustion chamber; and

j. piston lubrication means for carrying lubrication oil from an oil source through said piston rod to the periphery of said piston, said piston lubrication means comprising:

i. means for distributing lubricating oil from an oil source to said connecting road at the point where said connecting rod connects with the crankshaft;

ii. said connecting rod containing at least one oil lift tube communicating between said oil distribution means and said piston, said lift tube defined in part by an

interior surface and including a plurality of riffles positioned along the interior surface of said lift tube to cascade the oil upwardly through said lift tube in response to cyclic motion of said connecting rod, each of said riffles only partially spaning the distance between opposite portions of said interior surface to provide room for the moving oil to cascade past successive riffles from one to another;

iii. said piston containing a plurality of passageways communicating between said piston rod lift tube and the exterior surface of said piston for carrying oil therethrough to lubricate said piston surface; and

iv. a one-way valve positioned in said oil lift tube, said valve opening and closing in response to movement of said piston rod to meter the flow of oil from said distribution means to said lift tube while preventing the back flow of oil from said lift tube through said one-way valve.

3,973,533

IGNITION TIMING ADJUSTING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

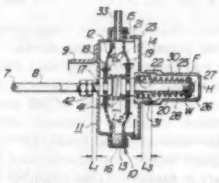
Isamu Arano, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 9, 1974, Ser. No. 531,168

Claims priority, application Japan, Dec. 14, 1973, 48-138599

Int. Cl.[2] F02P *5/04*

U.S. Cl. 123—117 A **6 Claims**



1. An ignition timing adjusting device for an internal combustion engine wherein ignition timing of the internal combustion engine is controlled by the negative pressure in an intake pipe of the engine, comprising two diaphragms having different effective pressure receiving areas and disposed in spaced juxtaposed relation to define therebetween a negative pressure chamber, means for transmitting a displacement of the first diaphragm of the smaller effective pressure receiving area to means for producing an ignition timing signal, and limiting means connected to the second diaphragm of the larger effective pressure receiving area and disposed outwardly of the negative pressure chamber to preclude displacement of the second diaphragm till the negative pressure in the negative pressure chamber reaches a predetermined value, said first diaphragm and said second diaphragm being operatively associated with each other such that when the second diaphragm is displaced by the negative pressure in the negative pressure chamber the first diaphragm is moved back in the direction of displacement of the second diaphragm against the force tending to cause the first diaphragm to be displaced.

3,973,534

CARBURETOR AERATOR

Russell J. Amos, 1415 Nye St., San Rafael, Calif. 94901

Filed June 7, 1974, Ser. No. 477,304

Int. Cl.[2] F02B *33/00*

U.S. Cl. 123—119 D **6 Claims**

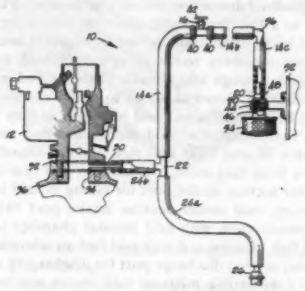
1. An internal combustion engine aerator apparatus for introducing additional air into the air-fuel mixture of an engine of the kind having a crankcase, a carburetor, and air-fuel intake structure including an intake manifold and in combination with gases vented from the crankcase through a first smog valve, said aerator apparatus comprising,

a pcv valve hose connected between the crankcase and the air-fuel intake structure,

an aerator hose for conducting the additional air to be introduced,

an adjustable valve associated with the aerator hose for regulating the amount of air that can be drawn through the aerator hose by the engine intake suction,

unidirectional valve means at the inlet end of the aerator hose for permitting substantially free entry of atmospheric air into the aerator hose under all conditions of engine operation from start-up through idle, acceleration, deceleration and steady state operation at all speeds and loads while preventing reverse flow of crankcase gases or loss of vacuum through said inlet end,



fitting means for conducting the other end of the aerator hose to the engine air-fuel intake structure at a point downstream of the carburetor in parallel with the pcv valve hose and closely adjacent to the point of connection of the pcv valve hose to said engine air-fuel intake structure,

wherein said unidirectional valve means is a second smog valve having a valve seat and a valve check element and mounted vertically to insure proper operation of the valve check element on the valve seat without binding,

and including a fender well close to said engine and wherein the second smog valve is mounted upright on the fender well so that the air passing through said second valve is warmed.

3,973,535

EXHAUST GAS RECIRCULATION SYSTEM

Kunihiko Sugihara, Yokohama; Yasuo Nakajima, Yokosuka; Yoshimasa Hayashi, and Shin-ichi Nagumo, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 20, 1975, Ser. No. 579,253

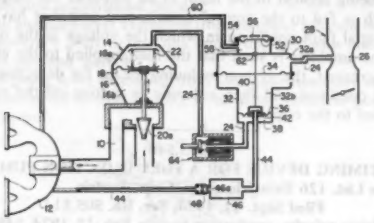
Claims priority, application Japan, June 27, 1974, 49-73731

Int. Cl.[2] F02M *25/00*

U.S. Cl. 123—119 A **3 Claims**

1. In combination an exhaust gas recirculation system, an internal combustion engine having an intake manifold and an exhaust manifold comprising, an exhaust gas recirculation passageway interconnecting the intake and exhaust manifolds, a control valve disposed in said exhaust gas recirculation passageway and having a valve head to vary the effective cross sectional area of said exhaust gas recirculation passageway, and a vacuum level control unit to supply vacuum into said control valve for actuating said valve head in dependence thereon, said vacuum level control unit including a first chamber communicating with a venturi portion of a carburetor of the engine, a second chamber vented to the atmosphere, a third chamber communicating with said control valve, a

fourth chamber communicating with the intake manifold of the engine, conduit means connected to the intake manifold of the engine and having a projecting end portion extending into said third chamber to selectively supply intake manifold vacuum thereinto, a first diaphragm member located between said first and second chambers and responsive to venturi vacuum supplied from said venturi portion of the carburetor, a second diaphragm member located between said second and third chambers and having an engaging portion selectively engageable with said projecting end portion of said conduit means to selectively close said projecting end portion of said



conduit means and a plurality of bores formed therein which selectively provides fluid communication between said second and third chambers, a third diaphragm member responsive to the intake manifold vacuum supplied into said fourth chamber, and a valve element connected to said first and third diaphragm members by a connecting rod and cooperating with said second diaphragm member to open and close said bores of said second diaphragm member while selectively causing said engaging portion of said second diaphragm member to disengage from said projecting end portion of said conduit means when said bores are closed by said valve element.

3,973,536

DEVICE FOR FEEDING FUEL TO A DIESEL ENGINE

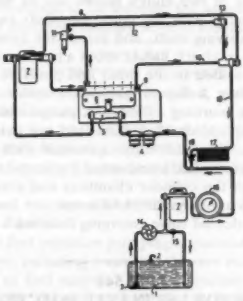
Wim Zelders, Nuenen, Netherlands, assignor to Van Doorne's Bedrijfswagenfabriek Daf B.V., Eindhoven, Netherlands

Filed May 28, 1974, Ser. No. 474,146

Claims priority, application Netherlands, Feb. 5, 1974, 7401553

Int. Cl.² F02M *59/00*

U.S. Cl. 123—136 **4 Claims**



1. In a fuel system for feeding fuel to a diesel engine and including a fuel storage tank, a fuel feed line including a feed pump leading from said storage tank to an injection pump connected to at least one atomizer, a return line for returning non-injected fuel to the fuel supply, a pressure control valve connected to said injection pump for reducing the pressure in said return line, and a flow measuring means in said fuel feed line for measuring consumption of fuel from said storage tank; the improvement comprising:

means connected to said return line for equalizing the temperature of the fuel therein with the temperature of the fuel in said feed line; and

means connected to said feed line for creating an over pressure condition in the fuel therein.

3,973,537

FUEL SUPPLY SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Malcolm Williams, Solihull; Geoffrey Albert Kenyon Brunt, Glastonbury; Christopher Robin Jones, Alcester, and Anthony John Adey, Slough, all of England, assignors to C.A.V. Limited, Birmingham, England

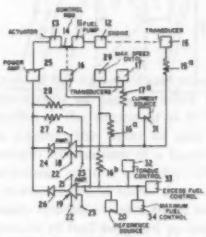
Division of Ser. No. 311,638, Dec. 4, 1972, Pat. No. 3,867,918.

This application Dec. 6, 1974, Ser. No. 530,409

Claims priority, application United Kingdom, Dec. 3, 1971, 56188/71

Int. Cl.² F02D *1/04*; F02M *39/00*

U.S. Cl. 123—139 E **45 Claims**



1. A fuel supply system for an engine, comprising in combination a pump for supplying fuel to the engine, pump control means for controlling the output of the pump, means for producing a first electrical signal representing the pump output, means for producing a second electrical signal representing engine speed, means for producing a demand signal representing the required engine speed, and a summing amplifier to which the three signals are applied, the summing amplifier comparing the three signals and controlling the pump control means, and further including a second summing amplifier which receives an input representing the pump output and also a reference input, and a discriminator coupling the first-mentioned and the second summing amplifiers to the pump control means, the output from the discriminator at any given instant being the output from the summing amplifier which demands the least fuel, so that the second summing amplifier limits the maximum pump output.

3,973,538

FUEL SYSTEMS FOR ENGINES

Malcolm Williams, Solihull; Christopher Robin Jones, Alcester, and Richard William Crookes, Solihull, all of England, assignors to C.A.V. Limited, Birmingham, England

Continuation of Ser. No. 429,366, Dec. 28, 1973, abandoned.

This application Feb. 11, 1975, Ser. No. 549,057

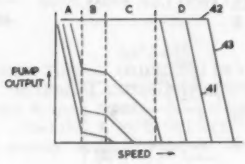
Claims priority, application United Kingdom, Jan. 6, 1973, 891/73

Int. Cl.² F02M *39/00*; F02D *1/04*

U.S. Cl. 123—139 E **1 Claim**

1. A fuel injection system for a diesel engine, comprising in combination a pump for supplying fuel to the engine, an electro-mechanical actuator coupled to the pump to determine the pump output, a drive circuit for controlling the electro-mechanical actuator, first, second and third transducers producing respectively output voltages representing engine speed, pump output and demanded engine speed, a first operational amplifier connected as a summing amplifier and having its inverting input connected through resistors to the first,

second and third transducers, said first amplifier producing an output representing the difference between the actual and demanded engine speeds, but the difference being modified in accordance with the input received from the second transducer so as to provide the required engine characteristics, a second operational amplifier connected as a summing amplifier and having its inverting input connected through a resistor to the second transducer, and a discriminator coupling the output of the amplifiers to the drive circuit, the arrangement being such that until a predetermined pump output is attained, the discriminator couples the first amplifier to the drive circuit, but when said predetermined rate of supply of fuel is reached, the discriminator couples the second amplifier to the drive circuit to limit the maximum rate of supply of fuel, the system further including first speed-sensitive means operable when the engine speed is below a first value to provide an input to the inverting input of the first operational amplifier so as to modify the engine characteristics, and second speed-sensitive means operable when the engine speed is below a second and lower predetermined value to provide a further input to the inverting input of the first operational amplifier, so as to further modify the engine characteristics.

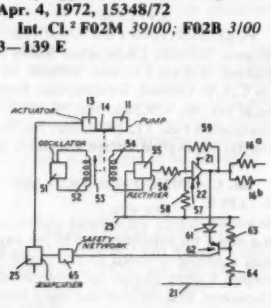


3,973,539

FUEL SYSTEMS FOR ENGINES

Christopher Robin Jones, Solihull; Malcolm Williams, Glastonbury, and Geoffrey Albert Kenyon Brunt, Alcester, all of England, assignors to C.A.V. Limited, Birmingham, England

Continuation of Ser. No. 347,720, April 4, 1973, abandoned.
This application Feb. 18, 1975, Ser. No. 550,651
Claims priority, application United Kingdom, Apr. 4, 1972, 15347/72; Apr. 4, 1972, 15348/72
Int. Cl.² F02M *39/00*; F02B *3/00*
U.S. Cl. 123—139 E **3 Claims**



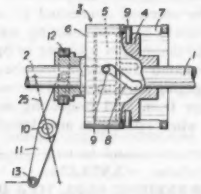
1. A fuel system for an engine comprising in combination a pump for supplying fuel to the engine, an actuator for controlling the output of the pump, a control circuit for controlling the actuator, and transducer means for providing said control circuit with at least two input signals representing parameters of the system, so as to control the fuel supply to the engine, one of said transducer means comprising a transformer having a primary winding and a secondary winding, means for supplying an alternating signal to the primary winding, a rectifier for rectifying the voltage developed across the secondary winding, further means coupled to said actuator, the setting of said further means being dependent upon the sett of said actuator and acting to vary the coupling between said primary and second windings, the output of said rectifier being applied to the input of an amplifier the output of which is fed to the control circuit, said amplifier having a potential fault condition in which the voltage at the output of the amplifier is such that the fuel supplied to the engine is increased, the system including means for detecting said fault condition and then reducing or cutting off the supply of fuel to the engine.

3,973,540

TIMING DEVICE FOR A FUEL INJECTION PUMP

Hans List, 126 Heinrichstrasse, Graz, Austria

Filed Sept. 12, 1974, Ser. No. 505,514
Claims priority, application Austria, Feb. 22, 1974, 1483/74
Int. Cl.² F02M *59/20*; F02D *1/12*
U.S. Cl. 123—139 AQ **2 Claims**



1. A device for the timing of the injection of an injection pump of an automotive diesel engine from a first end position for high engine performance and a minimum fuel consumption at full load into a second end position for a low percentage of noxious gases in the exhaust gas, comprising a pump-driving shaft, a pump camshaft in coaxial relation to same, a clutch consisting of two clutch halves one of which is non-rotatably connected with the pump camshaft and the other with the pump-driving shaft, and means for causing relative rotation of the two clutch halves about a predetermined angle from one end position to the other end position, said device further comprising a forced-lubrication system, a double-action hydraulic working cylinder, a piston slidable in said working cylinder and dividing same into two cylinder chambers, said piston being drivingly connected with said means, one supply line controlled by means of a solenoid valve emerging from each of the cylinder chambers and connected with the forced-lubrication system, and one return line controlled by means of a solenoid valve emerging from each of the cylinder chambers.

3,973,541

GOVERNOR FOR USE IN FUEL INJECTION PUMP

Yoshiatsu Nakamura, Ohimya; Hisato Nozawa, Oyama; Takuji Isomura, and Katsuyuki Nakagawa, both of Kariya, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 29, 1974, Ser. No. 474,226
Claims priority, application Japan, May 30, 1973, 48-59661
Int. Cl.² F02D *1/04*
U.S. Cl. 123—140 R **7 Claims**

1. A governor for controlling a fuel control rod in a fuel injection pump, comprising a fuel injection pump body with

the fuel control rod reciprocally extending therefrom and therein;

a. a cam shaft reciprocally extending from said pump body;

b. a governor body located in spaced relation to said pump body;

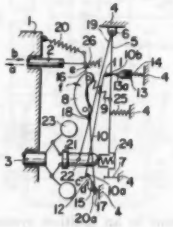
c. a rocking lever suspended from and within said governor body;

d. a floating lever connected to the fuel control rod, said floating lever having a pin located intermediate thereof, and a lower fulcrum at the lowest end thereof;

e. a link engaged with the lower fulcrum of said floating lever for moving the same, said link having a fulcrum located intermediate thereof;

f. an auxiliary lever extending from an upper fulcrum in said governor body to said link and is engaged with said link at one end thereof;

g. a guide lever extending from said governor body and is connected to said floating lever at intermediate portion thereof;



h. a starting spring connected to said floating lever and adapted to exert a force to move said floating lever in such a direction as to increase the amount of fuel to be injected by said fuel injection pump;

i. a damper spring disposed in opposition to said floating lever and adapted to bias said floating lever in the same direction as that of said starting spring;

j. a return spring connected to said auxiliary lever and adapted to exert a force to move the lower fulcrum of said floating lever in such a direction as to reduce the amount of fuel to be injected by said fuel injection pump;

k. means for moving said floating lever in parallel so as to push the fuel control rod in said fuel injection pump when the engine is accelerated abruptly; and

l. means for rotating said floating lever about said pin in such a direction as to increase the amount of fuel to be injected after said floating lever is moved in parallel.

3,973,542

LIQUID FUEL INJECTION PUMPING APPARATUS

Peter Nai-Kee Shum, Reading, England, assignor to C.A.V. Limited, Birmingham, England

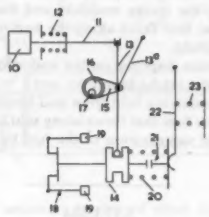
Continuation of Ser. No. 448,743, March 6, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,409

Claims priority, application United Kingdom, Mar. 6, 1973, 10691/73

Int. Cl.² F02D *1/04*

U.S. Cl. 123—140 R **6 Claims**

1. A liquid fuel injection pumping apparatus comprising an injection pump including a control element movable to adjust the quantity of fuel supplied by the injection pump at each injection stroke thereof, a centrifugal weight mechanism adapted to be driven at a speed which varies in accordance with the speed at which the associated engine is operating, a member movable by the weight mechanism, resilient means for resisting movement of the member by the weight, a lever which is pivotally connected to the member and the control element at spaced positions, and manually operable means for effecting movement of the lever about one or the other of its pivots to determine the setting of said control element, the improvement being that said resilient means comprises an idling spring and a pair of springs, said idling spring and said pair of springs being positioned in series with each other and acting against said member to resist movement thereof by said centrifugal weight mechanism, means limiting the extent of deflection of said idling spring whereby said idling spring is effective in conjunction with the weight mechanism to control the output of the pump only during idling of the engine, means pre-loading one of said pair of springs so that deflection of said one spring by said weight mechanism occurs only when the engine speed attains a predetermined value, deflection of said



one spring irrespective of the setting of said manually operable means allowing movement of said member to reduce the amount of fuel supplied to the engine so as to limit the maximum speed of the engine, the other of said springs being deflected by said weight mechanism at a lower engine speed than said predetermined value, whereby with increasing speeds below said predetermined value depending upon the setting of said manually operable means there will be a gradual reduction in the amount of fuel supplied to the engine.

3,973,543

APPARATUS FOR PROMOTING A VAPORIZATION OF A FUEL FOR AN INTERNAL COMBUSTION ENGINE

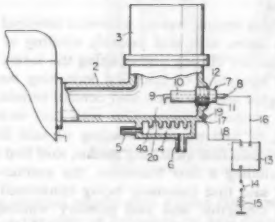
Masahiko Nakada, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 5, 1974, Ser. No. 458,433

Claims priority, application Japan, Sept. 10, 1973, 48-101886

Int. Cl.² F02M *29/00*

U.S. Cl. 123—141 **5 Claims**



1. An apparatus for promoting vaporization of liquid fuel in an internal combustion engine comprising:

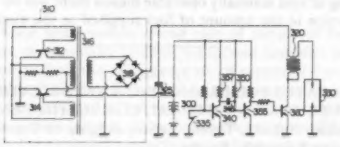
an internal combustion engine having an intake manifold that includes a substantially vertical inlet portion turning sharply to a portion having an approximately level bottom surface where fuel tends to be condensed in a liquid film,

a downdraft carburetor mounted on the intake manifold directly above the bottom surface for providing fuel and air mixture to the combustion chambers of the engine,

at least one electrode disposed in the intake manifold of the internal combustion engine directly beneath the inlet section at a predetermined height above the bottom surface of the intake manifold,

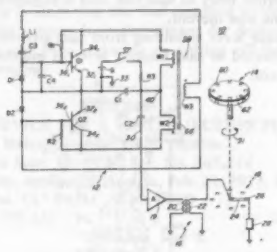
a conductive wire rod carrying said electrode at one end,
insulating means surrounding the wire rod for attaching the rod to the intake manifold,
a high voltage generator having one output terminal which is connected with the other end of said wire rod and another output terminal which is directly connected with the intake manifold, said high voltage generator forming an intensive electric field between said electrode and the interior of the intake manifold in the vicinity of said electrode for promoting vaporization of both the liquid fuel which floats as droplets in the fuel/air mixture passing through the intake manifold and the condensed film of liquid fuel that flows along the bottom surface of said intake manifold,
a heating portion disposed on the underside of said bottom surface of the intake manifold, and
means for transferring heat from said heating portion to the film of liquid fuel that flows along said bottom surface to enhance the vaporization of the fuel by the high voltage electrode.

3,973,544
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES
Seiji Suda, Mito, Japan, assignor to Hitachi, Ltd., Japan
Filed Aug. 21, 1973, Ser. No. 390,305
Claims priority, application Japan, Aug. 23, 1972, 47-83755
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 CB **31 Claims**



1. An ignition system for an internal combustion engine comprising:
a first transformer having a primary winding and a secondary winding, an output voltage of said secondary winding being applied to a spark plug in said internal combustion engine;
a first switching means, having a control terminal and connected in series with said primary winding of said first transformer, for closing and opening the series circuit in an on-off operation of said first switching means by a control signal applied upon said control terminal;
a capacitor connected in parallel with said series circuit consisting of said primary winding of said first transformer and said first switching means, said first switching means including a first transistor, the emitter-collector circuit of said first transistor being connected in series with said capacitor and said primary winding of said transformer to form a closed circuit, such that said capacitor discharges through said primary winding upon closing of said series circuit producing a first spark in said spark plug;
a voltage step-up circuit connected to a battery for stepping up the battery voltage, the output of said voltage step-up circuit being supplied to said capacitor for charging said capacitor; and
a control circuit means connected to said first switching means for producing and supplying said control signal to said first switching means in synchronism to the rotation of said engine, said control circuit means including a time constant circuit for opening said series circuit after a predetermined time has elapsed less than the duration of said control signal, said primary winding effecting a second spark in said spark plug upon opening said series circuit by means of stored electromagnetic energy in said primary winding during the discharge of said capacitor.

3,973,545
CONTACTLESS IGNITION SYSTEM UTILIZING A SATURABLE CORE TRANSFORMER
Martin Fischman, Seneca Falls, and John Matarese, Elnora, both of N.Y., assignors to GTE Laboratories Incorporated, Waltham, Mass.
Filed Jan. 23, 1975, Ser. No. 543,566
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 CB **5 Claims**

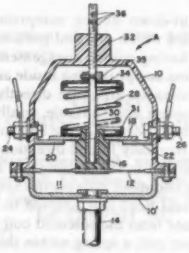


1. An improvement in an ignition system for an internal combustion engine of the type having an ignition coil and a device for synchronously distributing the voltage output of the coil to a plurality of sparkplugs comprising,
a. an oscillator comprising
1. first and second transistors each having first, second and third electrodes respectively, the first electrodes of the first and second transistors being coupled together,
2. a series resonant circuit having first and second ends, the first end being coupled to the third electrode of the first transistor,
3. a transformer having a saturable core and a first, second and third winding disposed around the core, each winding having a first and second terminal, the first terminals of the first and second transistors, respectively, and the second terminals of the first and second windings being coupled together to define a centertap, the first terminal of the third winding being coupled to the second end of the resonant circuit and the second terminal of the third winding being coupled to the third electrode of the second transistor, the third winding providing a feedback signal for the oscillator,
4. a first and second diodes coupled across the first and third electrodes of the first and second transistors respectively,
5. a loading capacitor coupled across one of the first and second diodes,
6. a resistance coupled power source connected to the centertap,
7. an output capacitor coupled between the ignition coil and the centertap and,
b. means for periodically saturating the transformer core in synchronism with the engine speed to interrupt the feedback signal to the oscillator and to provide an output pulse to the ignition coil.

3,973,546
STARTER SAFETY DEVICE
Forrest C. Scott, 220 S. East Ave., Baltimore, Md. 21224
Filed Aug. 2, 1974, Ser. No. 494,307
Int. Cl.² F02N *17/00*
U.S. Cl. 123—179 A **2 Claims**

1. In combination with an internal combustion engine, including an electrically operated starter motor having a pres-

surized oil lubricating system and an oil pump for creating said oil pressure, an electric storage battery having a positive terminal and a negative terminal, a two pole manually operated electrical switch, means for connecting a first pole of the manually operated switch to the positive terminal of the storage battery and means for connecting the negative pole of the storage battery to a ground, a second pole of the manually operated switch having means for connecting the same to a two pole pressure operatable switch and means for connecting the second pole of the pressure operatable switch to the starter motor, said pressure switch having a housing of two compartments, one of said compartments being hermetically sealed about its peripheral edge having a single oil inlet therein, a diaphragm extending between the two compartments and sealed thereto, an insulation spacer having a first end positioned on the diaphragm and a second end extending into the second compartment, having a first electric contact element secured to the second end of the insulation spacer, a



second pair of electric contact members oppositely disposed on said second compartment housing positioned to engage the first electric contact member and means extending through the said second compartment housing for attaching the second pair of electric contact members thereto, one of said attaching means being connected to one of the poles of the manually operated switch, and the other pole of the pressure switch being connected to the starter motor, a post fixed to the second compartment housing substantially perpendicular to the diaphragm, the inner end of which is slideably engagable with a hole formed in the second end of the insulation member, a compression spring having its outer end fixed to the outer end portion of the post, the opposite end of the spring adapted to bear against the first electrical contact element for holding the same in contact with the second pair of contact members whereby the first contact element will be moved out of engagement with the second contact members when the diaphragm is flexed by the pressure of the oil in the first compartment reaching a predetermined pressure.

3,973,547

ENGINE CYLINDER BLOCK AND HEAD CONNECTION

Eckhard Weiss, Vaihingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Jan. 17, 1975, Ser. No. 541,951

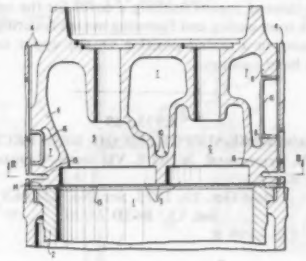
Claims priority, application Germany, Jan. 24, 1974, 2403255

Int. Cl.² F02F 1/26

U.S. Cl. 123—193 CH **29 Claims**

1. A reciprocating piston engine with at least one cylindrical working space means and with a cylinder head means sealingly clamped onto a cylinder block means, the cylinder head means which axially delimits the working space means, accommodates liquid-cooled control members and contains channel means for the working medium and the cooling medium which are closed off with respect to each other, including a bottom plate means and reinforcing wall means acting reinforcingly on the bottom plate means, the bottom plate means and the reinforcing wall means being components of the cylinder head means, characterized in that the elastic yieldingness of the bottom plate means is constructed as uniformly hard as possible within the area of the circumferential configuration of the cylinder means, and

characterized in that at those places of the reinforcing wall means at which the reinforcing wall means either intersect or are tangent to the circumferential configuration of



a cylinder means, a weakened place is provided in the reinforcing wall means at the root between the reinforcing wall means and the bottom plate means, which weakens the supporting effect of the reinforcing wall means on the bottom plate means.

3,973,548

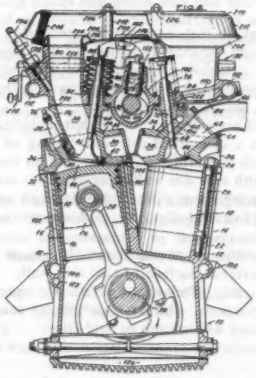
ENGINE WITH DIE CAST STATIC PARTS

Aldo Celli, 1730 First Federal Bldg., Detroit, Mich. 48226

Filed May 29, 1975, Ser. No. 581,784

Int. Cl.² F02F 7/00

U.S. Cl. 123—195 R **14 Claims**



1. An internal combustion engine comprising a crankcase casting, a plurality of cylinders on said crankcase casting, a plurality of cylinder head castings, one for each cylinder, mounted on and closing the upper end of each cylinder, said cylinder head castings each having a generally flat flanged surface thereon, the flanged surfaces of all of the cylinder head castings lying in substantially the same horizontal plane, each cylinder head casting having a top wall and an integral generally vertical tubular extension thereon defining an air intake passageway for the cylinder, the upper end of each tubular extension being of annular shape and defining said flat flanged surface, each cylinder head casting also having an integral generally vertically disposed valve stem guide thereon, each valve stem guide being surrounded by said flat flanged surface, a casting defining a valve train casing, said casing having a bottom wall closing the lower end thereof, said bottom wall having a plurality of openings therein spaced

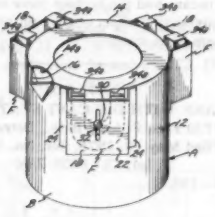
apart to correspond and register with the spacing of said valve stem guides and the upper ends of said intake passageway extensions on the cylinder head castings, each of said openings being surrounded by a flat surface on the bottom face of said bottom wall, said valve train casing being seated on said cylinder head castings with a gasket interposed between said flat surfaces thereof, means forming a cover for the upper end of the valve train casing and fastening means securing said valve train casing in a seated position on the upper ends of said cylinder head castings.

3,973,549

CRANKCASE-SUPPORTED OIL DRIP RECEIVER

Ronald B. Drummond, 26202 E. Via Serra, Capistrano Beach, Calif. 92624

Filed Oct. 23, 1975, Ser. No. 624,863
Int. Cl.² B62D 25/20
U.S. Cl. 123—198 R 4 Claims



1. A device that is removably securable in a depending position from the exterior surface of the lowermost portion of a ferrous automotive crankcase of an internal combustion engine to receive oil that drips downwardly therefrom by force of gravity, said device including:

a. an oil-receiving container that includes a bottom from which a cylindrical side wall having an exterior surface extends upwardly to develop into an inwardly extending lip, with said side wall being adjacent said lip and having a pouring spout defined therein, with said pouring spout being in radial alignment with an opening formed in said lip;

b. a plurality of circumferentially spaced clips secured to said exterior surface of said side wall;

c. a plurality of elongate permanent magnets having first end portions, with at least one of said magnets being disposed within each of said clips;

d. a plurality of pressure plates disposed within said clips; and

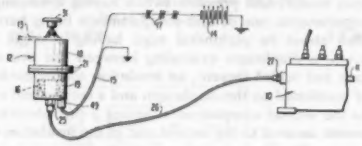
e. first manually operable means for moving said plates towards said clips to frictionally engage said magnets and maintain said first end portions thereof sufficiently above said lip that said first end portions contact and cling to said exterior surface of said lowermost portion, said lip being spaced from said exterior surface of said lowermost portion a sufficient distance to permit oil that leaks from said internal combustion engine or from an elevated position on said crankcase to flow downwardly by force of gravity on said external surface through said space between said external surface and said lip to drip into said container, with said lip preventing the discharge of oil from said container when said automotive vehicle on which it is mounted starts and stops, and with said device being manually removable from said crankcase when said vehicle on which it is mounted is stationary to permit oil collected in said container to be poured therefrom through said spout.

3,973,550

ENGINE SHUT-DOWN DEVICE

Buddy G. Sparks, Tulsa, and Lewis M. Carlton, Jenks, both of Okla., assignors to Frank W. Murphy Manufacturer, Inc., Tulsa, Okla.

Filed Nov. 10, 1975, Ser. No. 630,619
Int. Cl.² F02B 77/00
U.S. Cl. 123—198 DB 10 Claims



1. An engine shut-down device comprising a housing, a solenoid coil mounted within one end portion of the housing, a manual reset rod having guided engagement with the opposite end of the housing and projecting inside and outside of the housing axially, a solenoid armature directly carried by the reset rod in the housing and shiftable axially therewith and adapted to enter a bore portion of the solenoid coil when the reset rod is moved manually in one direction, a locking head element on the reset rod in the housing and intermediate the ends of the rod, an abutment disc on the reset rod in axially spaced relation to said head and adapted to contact the end of the housing remote from the solenoid coil to limit outward extension of the reset rod, a spring within the housing engaging the abutment disc and urging it constantly toward the last-named end of the housing, an actuator cable means extending beyond the end of the housing adjacent to the solenoid coil and attached to said reset rod and armature and moving therewith and adapted for connection with a shiftable fuel control rack of an engine, and a mechanical latching means for said locking head element of the reset rod moving into latching engagement with the head element whenever the reset rod is manually operated and the holding force of the mechanical latching means plus the holding force of the solenoid coil on said armature being sufficient to retain said reset rod latched in an engine on position, de-energizing of said coil responsive to an engine malfunction causing said mechanical latching means to be overcome by the force of said spring whereby the reset rod is shifted with said cable means to an engine shut-down position.

3,973,551

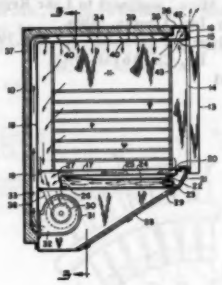
POWERED CIRCULATION OVEN

Richard E. Caselani, Ashland; John W. Gilliom, Mansfield; Robert H. McFarland, Mansfield, and Richard L. Perl, Mansfield, all of Ohio, assignors to The Tappan Company, Mansfield, Ohio

Filed Nov. 3, 1972, Ser. No. 303,325
Int. Cl.² A21B 1/26; F24C 15/32
U.S. Cl. 126—21 A 10 Claims

5. A powered circulation oven having a cooking cavity, a heat source located outside of said cavity and having a directional output, blower means likewise located outside the cavity, means for directing such output from said heat source to the intake side of said blower means, means for directing the output of said blower means to the exterior top of the cavity and discharging the same substantially fully through such top substantially uniformly over the full area of the same, means for withdrawing substantially all of the air and vapors from the cavity at the bottom thereof, and means for directing the thus withdrawn air and gases likewise to the intake side of the blower means for recirculation thereby through the cavity along a path that at least in part coincides with that of the heat energy output of the heat source ahead of the blower, whereby the recirculated air and gases from the cavity are exposed to

such heat energy ahead of the blower for consumption of grease particles and the like in the thus withdrawn air and



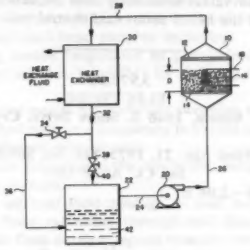
gases for consumption of the same prior to recirculation through the oven cavity.

3,973,552

METHOD OF STORING AND RELEASING THERMAL ENERGY

Guy Ervin, Jr., Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 23, 1975, Ser. No. 589,733
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **10 Claims**



1. A cyclic method of storing and recovering thermal energy comprising:

providing a container having at least one water-permeable wall for the passage of water vapor therethrough;

providing a particulate bed of a selected heat storage material in said container adjacent at least said one water-permeable wall, said heat storage material being selected from the group consisting of the hydroxides of magnesium, calcium, and barium, said bed of selected material having an apparent density of from 25% to 75% and a depth of less than about 40 cm;

heating said bed of selected hydroxide to a temperature within the range of from about 300° to 900°C and above the decomposition temperature of the selected hydroxide for a time sufficient to decompose at least a part of the selected hydroxide to form the corresponding oxide and water vapor;

withdrawing the formed water vapor by passing a carrier gas into contact with said water-permeable wall of the container to absorb the water vapor permeating therethrough; and

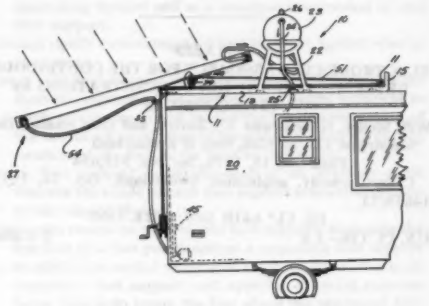
recovering thermal energy by passing a water vapor-laden carrier gas into contact with the water-permeable wall whereby the water vapor permeates through the wall into contact with the oxide to reform the selected hydroxide and generate heat.

3,973,553

COMBINATION SOLAR HEAT COLLECTOR AND AWNING

Joseph A. Lanciault, 16 Prichard St., Apt. 710, Fitchburg, Mass. 01420

Filed July 7, 1975, Ser. No. 593,557
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **5 Claims**



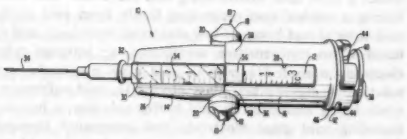
1. A combined solar heater and awning unit for attachment to vehicles of the type having a generally flat horizontal roof comprising a base adapted to be supported on and adhesively secured to the vehicle roof, a pair of longitudinally extending spaced apart parallel cog tracks secured to said base, an insulated box having a glass or fiber-glass covered top, means including spur gears engaging in said cog tracks for supporting said box for longitudinal movement along said base, means at one end of said cog tracks engagable with said spur gears for raising one end of said box to position said box at an angle to the horizontal, means in said box for collecting solar heat in water, means extending from said box to supply water to be heated to said box, means extending from said box for conducting heated water to a place of use, means on said vehicle connected to said box for rotating said spur gears to move said box longitudinally on said vehicle.

3,973,554

RADIATION SAFETY SHIELD FOR A SYRINGE

Harold W. Tipton, Woodbridge, Va., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Apr. 24, 1975, Ser. No. 571,214
Int. Cl.² A61B *6/00*
U.S. Cl. 128—1.1 **8 Claims**



1. A radiation safety apparatus for use with a syringe for containing a radioactive liquid, comprising:

a cylindrical sheath for encircling the distal end of a syringe;

a retractable cylindrical shield for encircling the proximal end of the syringe and constructed of a material capable of attenuating significant amounts of radiation from a radioactive source, said shield being coaxial with said sheath and being capable of retracting into said sheath; and

means to couple said shield and said sheath coaxially together and to permit said shield to telescope into said sheath while being frictionally maintained in axial position relative to said sheath;

wherein said shield is extensible over the proximal end of the syringe to ensure that radioactive rays do not escape when the syringe contains a radioactive serum, but whereby said shield can be retracted within said sheath to allow for assaying of a radioactive substance.

3,973,555

ELECTRODE CELL ASSEMBLY FOR THE CONTINUOUS DETERMINATION OF ION CONCENTRATIONS IN LIVING TISSUES

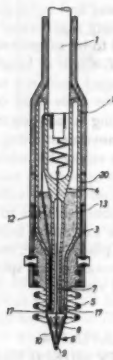
Willi Moller, Gubelstrasse 37, Zurich, and Otto Stamm, Dufourstrasse 121, St. Gall, both of Switzerland

Filed Oct. 15, 1974, Ser. No. 515,034

Claims priority, application Switzerland, Oct. 16, 1973, 14659/73

Int. Cl.² A61B *5/04*; B01K *3/06*

U.S. Cl. 128—2 E **5 Claims**



1. An electrode cell assembly for the continuous determination of ion concentration in living tissues, said assembly comprising a measuring electrode including a hollow glass electrode, a steel tube surrounding said electrode, said electrode having a conical end projecting freely from said steel tube, said conical end being of low electrical resistance and constituted as an ion sensitive membrane, an internal reference electrode mounted axially in said glass electrode, a buffer solution in said hollow glass electrode, said reference electrode being immersed in said buffer solution, a housing surrounding said glass electrode and integrated therewith to define an annular chamber, an electrolyte in said annular chamber, a reference electrode in said annular chamber and inserted into said electrolyte, said housing merging with said conical end of the hollow glass electrode, membrane means supported by said housing in the region where the latter merges with the conical end of the glass electrode for contact with the living tissue when the conical end is brought into operative association with the living tissue, and anchoring means coupled to said steel tube and surrounding said reference electrode for retaining the measuring electrode in operative association with the living tissue.

3,973,556

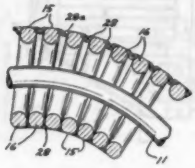
SMOOTHENED COIL SPRING WIRE GUIDE

John J. Fleischhacker, and Joseph F. Fleischhacker, Jr., both of Minnetonka, Minn., assignors to Lake Region Manufacturing Company, Inc., Chaska, Minn.

Filed June 20, 1975, Ser. No. 588,793

Int. Cl.² A61M *25/00*

U.S. Cl. 128—2 M **9 Claims**



1. A vascular coil spring guide comprising an elongated coil spring having a central axis and an elongated distal end portion, and an elongated wire core extending within said distal end portion, said distal end portion including adjacent wire helics that in coil spring straightened condition have helical chordal surfaces substantially parallel to said central axis and of substantially the same radial spacing from said central axis throughout the helical circumferential length thereof, and partial, substantially circular cylindrical helical surfaces having radii of curvature emanating from the helics axis of helical curvature of the helics about said central axis.

3,973,557

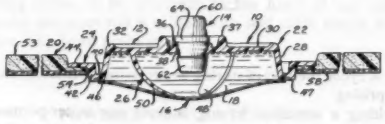
ELECTRODE

Kenneth C. Allison, 1546 S. Shore Drive, Crystal Lake, Ill. 60014

Filed Apr. 21, 1975, Ser. No. 569,813

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 E **19 Claims**



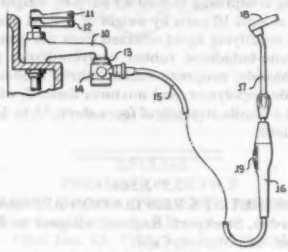
1. A biomedical electrode for use on a subject for receiving electrical signals from said subject, comprising: a resilient container having an open side, a thin microporous diaphragm sealingly secured to the container closing said open side, a resilient cantilever finger having one end formed integral with the interior of the container, said resilient finger having its free end contacting the interior of the diaphragm to hold the diaphragm outward from the interior of the container, an electrolyte in the container in contact with the diaphragm permeating the diaphragm to wet the outside surface of the diaphragm to have direct contact with a surface of the subject through the diaphragm between said surface of the subject and the electrolyte in the container, said container having a filling aperture, and a terminal plug mounted in said filling aperture in sealing engagement with the container and having a portion in contact with the electrolyte to form a half cell therewith, said terminal plug having a head extending exteriorly of the container adapted for electrical connection to an electrical connector.

3,973,558

SWEPT JET ORAL IRRIGATOR

Ronald D. Stouffer, Silver Spring, and Peter Bauer, Germantown, both of Md., assignors to Bowles Fluidics Corporation, Silver Spring, Md.

Filed Sept. 30, 1974, Ser. No. 510,701
Int. Cl.² A61H 9/00
U.S. Cl. 128—66 14 Claims



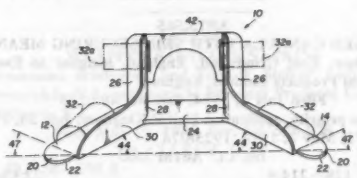
1. An oral irrigator comprising:
fluid conduit means adapted to receive and conduct pressurized liquid;
handle means including an internal fluid passage arranged to receive pressurized liquid from said fluid control means; and
a head member adapted to receive pressurized liquid from said fluid passage, said head member being of a size suitable for insertion into the oral cavity of a user of said oral irrigator, said head member including:
jet-defining means responsive to pressurized liquid received by said head member for defining a jet of said liquid;
cyclical sweep means for cyclically sweeping said jet over a prescribed path at a frequency in excess of two thousand cycles per minute; and
outlet means for issuing the cyclically swept jet in a sweeping pattern;
wherein said internal fluid passage in said handle means includes a bore extending through said handle means, wherein said fluid conduit means extends into said bore, and wherein said control valve includes means for selectively crimping said fluid conduit means in said bore.

3,973,559

CHILDREN'S CORRECTIVE FOOT SPLINT

Reuben H. Reiman, 17 Beverly Road, Port Washington, N.Y. 11050

Continuation-in-part of Ser. No. 497,196, Aug. 14, 1974, Pat. No. 3,910,267. This application June 6, 1975, Ser. No. 584,252
Int. Cl.² A61F 3/00
U.S. Cl. 128—80 A 4 Claims



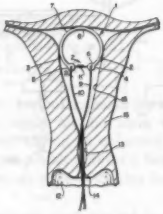
1. A foot splint for attachment to the feet of a child for correcting toe-in and related abnormalities comprising
a substantially planar support for the full length of each foot,
a heel support unitary with each of said foot supports,
said heel supports extending for a portion of the length of its respective foot support at a medial inner portion thereof and being curved about the heel of its respective foot support for a portion thereof delineating the heel of its respective foot support,
a wall contiguous with each planar support to extend upward therefrom beginning from the forefoot supporting portion of said planar support and continuing rearward therealong toward and as a contiguous extension of said heel support,
means rigidly connecting said foot supports against relative movement,
each said heel support including means extending upward from its respective foot support for a height sufficient to apply a restraint to and against the relative movement of the heel of a foot positioned thereagainst while permitting rotation of the foot at the heel so restrained,
each foot support being disposed at an eversion angle wherein the inside of each foot support is lowered relative to the outside thereof,
and strap means on each of said foot supports to engage the forefoot of a foot positioned on a respective foot support to inhibit the medial rotation of the forefoot relative to its respective foot support and applying a lateral outward force thereto to rotate the foot about the restrained heel of the foot.

3,973,560

INTRAUTERINE DEVICE OF C OR OMEGA FORM

Lionel C. R. Emmett, Kingston-upon Thames, England, assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Filed July 19, 1974, Ser. No. 489,982
Claims priority, application United Kingdom, July 27, 1973, 35816/73
Int. Cl.² A61F 5/46
U.S. Cl. 128—130 47 Claims



1. A linear type of intrauterine contraceptive device made of flexible material comprising: an elongate member which, in situ, assumes a linear arch-shape wherein the two terminal portions of the linear form are connected by a noninterrupted continuous arch form, and the terminal portions curve inwardly toward each other providing incurved, oppositely directed linear portions in opposed relationship at each end of the arch form disposed in substantially linear alignment, in situ; said member having a plurality of surface serrations and being of material with sufficient flexibility to assume a substantially straight linear form to accommodate insertion, and thereafter assume the arched, in situ, configuration, which has dimensions substantially encompassing an area enabling the device to be contained within a normal uterus; and at least a part of the surface area of the device comprising a metallic wire contraceptive agent wound around the member between serrations, whereby the coils of the wire are spaced apart and maintained in position.

3,973,561

EYE PATCH FOR LARGE DOMESTIC ANIMALS

George K. Kane, P.O. Box 360, Sioux Falls, S. Dak. 57101

Filed June 30, 1975, Ser. No. 591,348
Int. Cl.² A61F 13/00
U.S. Cl. 128—132 R 5 Claims

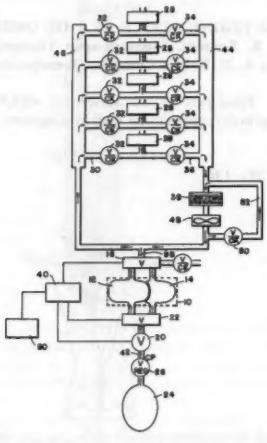
1. An eye shield adapted to cover the eye of a large domestic animal comprising a cover of dome shape with a flange attached to said dome shape, said cover being formed of a laminated material having a resilient opaque base material and an abrasion-resistant film laminated with said base material, and adhesive securing means on said flange whereby said cover is attachable to said animal.

3,973,562

MULTI-USER EXTENDED OPERATION RESPIRATOR

David Guild Jansson, 85 Pond St., Natick, Mass. 01760

Filed July 29, 1974, Ser. No. 492,719
Int. Cl.² A62B 7/02
U.S. Cl. 128—142 R 8 Claims



1. A self-contained, multiple-user respirator system comprising:

a source of compressed oxygen-rich gas;

a single breathing bag means;

a breathing conduit loop including said breathing bag means, an inhalation manifold in fluid communication with said breathing bag means, a scrubber to remove carbon dioxide from exhaled gas, an exhalation manifold in fluid communication with said breathing bag means through said scrubber, and a multiplicity of breathing stations each between and in fluid communication with said inhalation and exhalation manifolds;

means in said breathing conduit loop to determine when the concentration of oxygen in the gas therein falls to a lowest tolerable level;

means to vent from said breathing bag means, upon signal from said determining means, at least a portion of said gas having an oxygen concentration at said lowest tolerable level; and

means to replenish the breathing bag means with gas from said source.

3,973,563

ADHESIVE BANDAGE BACKINGS

Percy Green, Piscataway; Margaret Cook Kordecki, Highland Park, and Roger David Arnold Lipman, Princeton, all of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Mar. 6, 1975, Ser. No. 556,029
Int. Cl.² A61L 15/00
U.S. Cl. 128—156 15 Claims

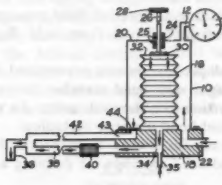
1. A highly conformable pressure-sensitive adhesive bandage backing comprising at least 45 parts by weight of natural rubber and at least 10 parts by weight of at least one synthetic elastomeric modifying agent selected from the group consisting of styrene-butadiene rubber, polyurethane, plasticized polyvinyl chloride, neoprene rubber, nitrile rubber, ethylene vinyl chloride copolymer, and mixtures thereof; wherein said backing has a tensile strength of from about 75 to 500 pounds per square inch.

3,973,564

ANAESTHETIST'S RESPIRATION APPARATUS

Edward Carden, Stockport, England, assignor to Dupaco Incorporated, San Marcos, Calif.

Filed Aug. 8, 1974, Ser. No. 495,658
Int. Cl.² A61M 16/00
U.S. Cl. 128—202 7 Claims



1. Anaesthetist's respiration apparatus comprising a housing enclosing an expansible and contractible container, the housing defining a continuously open and unvalved fresh gas supply passageway to the interior of the container, a respiration tube, adapted for providing a respiration gas supply to a patient, having a continuously open connection to the interior of the container and also being connected by a branch connection therefrom to the housing outside of the container by way of a non-return valve permitting flow only in the direction from the respiration tube into the housing, the volume within the container and the respiration tube between the branch connection and the container comprising a reservoir for an initial volume of gas exhaled by a patient, means for adjusting the extent by which the container may expand, and an unvalved outlet opening from the housing outside of the container for flow from the housing of gas exhaled by a patient, in excess of said initial volume, communicated to the housing externally of the container via the branch connection and the non-return valve.

3,973,565

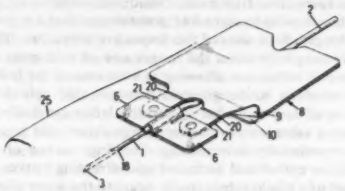
WINGED CANNULA WITH SKIN SECURING MEANS

Peter Steer, East Grindstead, England, assignor to Everett Medical Products Limited, England

Filed July 5, 1974, Ser. No. 486,235
Claims priority, application United Kingdom, July 20, 1973, 34720/73; May 2, 1974, 19258/74
Int. Cl.² A61M 5/00
U.S. Cl. 128—214.4 22 Claims

1. In a surgical device of the kind comprising a cannula fitted with at least one laterally extending flexible, flattened wing permanently attached thereto, the improvement which comprises an additional sheet of flexible material having an adhesive surface, said sheet being connected to said at least

one wing and being of a size so as to be capable of folding over said at least one wing to first cover said wing and thereafter



engage the skin of a patient whereby to hold said device in position.

3,973,566

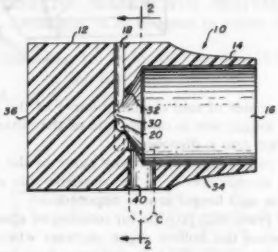
INHALATION DEVICE

Stanley Mathes, Mountain View, Calif., assignor to Syntex Puerto Rico Inc., Humacao, P.R.

Filed Jan. 13, 1975, Ser. No. 540,613

Int. Cl.² A61M *13/00*

U.S. Cl. 128—266 **18 Claims**



1. An inhalation device comprising an elongate housing having an emptying chamber adjacent the output end of said housing, said emptying chamber terminating, at the inner end thereof, in an inner surface; a plurality of passageways extending substantially perpendicular to the longitudinal axis of said housing and intersecting with said inner end of said emptying chamber, the longitudinal axes of said passageways intersecting adjacent said inner end, the intersection of the longitudinal axes of said passageways being off-set with respect to the longitudinal axis of said emptying chamber; and means adjacent the inner end of said emptying chamber for receiving a medicament-holding container, said container receiving means comprising an exterior opening in said housing into which the container can be directly inserted from the exterior of said device, whereby during inhalation, turbulent air flow is generated within, and through, said emptying chamber, a component of which flows into said opening whereby medicament held in a medicament-holding container positioned in said opening is dispensed therefrom.

3,973,567

WRAPPED SANITARY NAPKINS

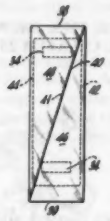
Subramanian Srinivasan, and Fred H. Steiger, both of East Brunswick, N.J., assignors to Personal Products Company, Milltown, N.J.

Filed May 19, 1975, Ser. No. 578,978

Int. Cl.² A61F *13/16*

U.S. Cl. 128—290 R **7 Claims**

1. In a sanitary napkin having an adhesive element thereon for attaching to an undergarment, the improvement which comprises means for protecting said napkin and said adhesive element prior to use and for discarding said napkin after use, said means comprising a sheet of flexible wrapper material overlying one major surface and the sides of said napkin and at least partially overlapping on the second major surface of



said napkin, said sheet being releasably adhered to and held in place by said adhesive element.

3,973,568

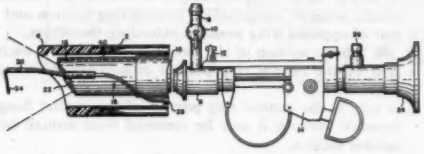
STABILIZED CUTTING LOOP FOR RESECTOSCOPE WITH UNIMPAIRED VISION OF THE OPERATIVE FIELD

Jose J. Iglesias, 1341 North Ave., Elizabeth, N.J. 07200

Continuation-in-part of Ser. No. 219,687, Jan. 21, 1972. This application Feb. 12, 1975, Ser. No. 549,492

Int. Cl.² A61B *17/32*

U.S. Cl. 128—303.15 **4 Claims**



1. In a resectoscope, a tubular sheath having a distal end, an optical telescope having a tubular stem within the sheath having a distal end and having an objective lens adjacent the distal end of the sheath which defines a field of vision at the distal end of the telescope stem, a cutting loop assembly comprising

a. at least one electrode wire carried by and mounted for reciprocation along the telescope stem and having a generally loop-shaped distal part comprising a pair of electrically insulated arms extending in spaced relation along opposite sides of the telescope stem and an uninsulated cutting electrode constituting a distal continuation of each arm and positioned in the field of vision of the telescope,

b. a stabilizing tube slidably mounted on the telescope stem having a distal end adjacent the distal end of the sheath and extending between and engaging and supporting said spaced arms and maintaining the same in spaced relation to opposite sides of the telescope stem,

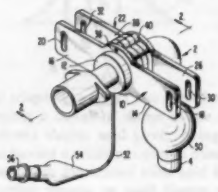
c. the tube being of such length and so positioned with respect to the other parts of the resectoscope that its distal end is adjacent and proximate to the objective lens and does not extend into the field of vision of the telescope at the maximum extension of the cutting loop assembly in the direction of the operative field,

d. and a connection between the distal end of the tube and each of the spaced arms.

3,973,569
TRACHEOSTOMY TUBE DEVICE WITH NECK SIZE ADJUSTMENT MEANS

David S. Sheridan, Argyle, and Isaac S. Jackson, Greenwich, both of N.Y., assignors to National Catheter Corporation, Argyle, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,433
Int. Cl.² A61M 25/00
U.S. Cl. 128—351 5 Claims



1. In a tracheostomy tube device having an endotracheal portion and an integral exocorporeal portion defined in part by a tubular section formed of non-fibrous plastic material, the improvement which permits the device to be held firmly in proper position upon a person into whom the endotracheal portion has been inserted regardless of the neck size of such person, the improvement which comprises:

A. a first flange member formed of flexible, non-fibrous plastic material comprising a central ring portion and a pair of opposed wing portions extending therefrom,

B. the tubular section of the device being fixedly encircled by said central ring portion,

C. a second flange member formed of flexible, non-fibrous plastic material comprising a central ring portion and a pair of opposed wing portions extending therefrom,

D. the tubular section of the device being slideably encircled by the central ring portion of said second flange member,

E. a split in the central ring portion of the second flange member whereby it may be removed from around said tubular section,

F. a plurality of split ring members formed of flexible, non-fibrous plastic material encircling said tubular section positioned between said first and second flange members, and

G. a slot in the outer end of each wing portion of said first and second flange members through which tie tape may be passed to be tied around the neck of a person on which said tube device is installed.

3,973,570
SURGICAL CLIP FORMED FROM A SUTURE MATERIAL FOR END-TO-END SUTURING OF HOLLOW ORGANS ON A MANDREL

Mikhail Mikhailovich Razgulov, ulitsa, Mashinostroitelei, 32, kv. 80, Podolsk, Moskovskoi oblasti; Lidia Alexandrouna Potekhina, Mosfilmovskaya ulitsa, 27, kv. 27, and Boris Fedorovich Mashinistov, Boitsovaya ulitsa, 13 korpus 1, kv. 5, both of Moscow, all of U.S.S.R.

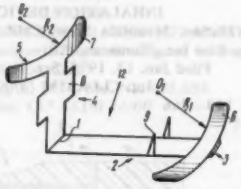
Filed June 18, 1974, Ser. No. 480,537
Int. Cl.² A61B 17/08, 17/11
U.S. Cl. 128—337 1 Claim

1. A surgical clip formed from a suture material, to make an end-to-end suture on a mandrel in two axially aligned sections of a hollow organ, the latter having an outer diameter between 4 and 10 millimeters and a corresponding very small wall thickness, comprising a plurality of staples formed from pairs of sections of a strip, that are bent about a bending line, relative to a laterial axis of said strip, each staple comprising

a. two arms constituted by said strip sections, extending from said bending line of the strip to respective free ends of the same staple, having different lengths, and respective planes substantially at an angle of 90° with respect to each other;

b. substantially C-shaped cylindrical cross bars for said arms on the respective free ends; cylindrical surfaces of said cross bars having straight-line generatrices that are parallel to longitudinal axes of the respective arms; the difference in length between the longer one of said arms and the shorter other arm allowing at least one of the hollow organ sections to be grasped between said cylindrical surfaces of said cross bars when the latter are folded in use into a substantially overlapping position; said generatrices continually intersecting directing curves of the respective cylindrical surfaces; said directing curves being part of a circle substantially equal to the outer diameter of the at least one hollow organ section being grasped; and

c. said shorter arm having an expanding portion for secure fixation in said mandrel; wherein



1. the center of said directing curve of the cross bar of said longer arm is on the side of the latter where said shorter arm is disposed;

2. the center of said directing curve of the cross bar of said shorter arm is on the opposite side of the latter, where said longer arm is disposed;

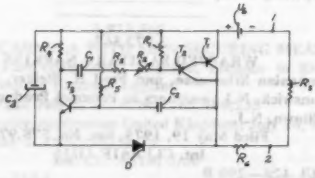
3. said cross bars provide for suturing by clamping therebetween the hollow organ sections when aligned on said mandrel and when said cross bars are folded into the overlapping position; and wherein

4. said longer arm is provided with at least one lug for securing said staple by puncturing the wall of at least one hollow organ section, said lug to be bent beyond the line of the suture formed between said cross bars, thereby increasing the strength of the suture in the hollow organ.

3,973,571
CIRCUIT ARRANGEMENT FOR AN AUTOMATIC INTEGRATED INTRAVAGINAL STIMULATOR

Peter Suhel, Ljubljana, Yugoslavia, assignor to "Gorenje" tovarna gospodinjske opreme, Velenje, Yugoslavia

Filed Aug. 14, 1975, Ser. No. 604,815
Claims priority, application Yugoslavia, Aug. 29, 1974, 2342/74
Int. Cl.² A61N 1/36
U.S. Cl. 128—408 3 Claims



1. Circuit arrangement for an automatic integrated intravaginal stimulator, characterized in that to the positive terminal of the battery (U_b) there is connected the emitter of the transistor (T_1), one terminal of the resistors (R_1, R_4, R_8) and the

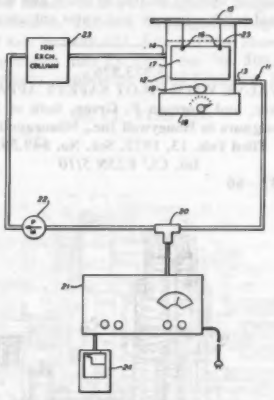
positive terminal of the electrolytic capacitor (C_3), and that the collector of the transistor (T_1) is together with the collector of the transistor (T_2) connected to one terminal of the capacitor (C_2) and at the same time to the junction point of the cathode of the diode (D) and one terminal of the resistor (R_6), whereby the base of the transistor (T_1) is connected to the emitter of the transistor (T_2), while the base of the transistor (T_2) is connected to the junction point of the other terminal of the resistor (R_1) and one terminal of the resistor (R_2), the other terminal being connected to one terminal of the resistor (R_3), whose other terminal is over the capacitor (C_1) connected to the junction point of the other terminal of the resistor (R_4) and the collector of the transistor (T_3), whose base is connected to the junction point of the other terminal of the resistor (R_5) and the capacitor (C_2) and whose emitter is connected to the junction point of the negative terminal of the electrolytic capacitor (C_3) and the anode of the diode (D), while the negative terminal of the battery (U_b) is connected to the connector (1) for the load (R_4) and the other terminal of the resistor (R_6) is connected to the connector (2) for the load (R_4).

3,973,572

SELF-PURGING APPARATUS FOR DETERMINING THE QUANTITATIVE PRESENCE OF DERIVED IONS

Jack Brous, Livingston, N.J., assignor to Alpha Metals, Inc., Jersey City, N.J.

Filed Aug. 12, 1974, Ser. No. 496,403
Int. Cl.² B08B 3/04
U.S. Cl. 134—57 R **7 Claims**



1. A self-purging apparatus for measuring the quantitative amount of ions removed from an ion-containing component, said ions being removed from said component by means of a liquid solvent therefor, said apparatus comprising:

a. a liquid-containing vessel having an inlet and outlet, said vessel adapted to contain said ion-containing component, so that any liquid exiting from said vessel passes through said outlet,

b. a deionizer having an inlet and an outlet,

c. a conductivity cell having an inlet and an outlet for signaling the presence of ionic matter in said liquid passing through the cell,

d. conduit means connecting the outlet of the vessel to the inlet of the conductivity cell, so that all of said liquid exiting from said vessel enters said conductivity cell; conduit means connecting the outlet of the conductivity cell to the inlet of the deionizer; and conduit means connecting the outlet of the deionizer to the inlet to the vessel; the conduits, vessel, deionizer and conductivity cell defining a continuous closed loop for circulating said liquid solvent,

e. means connected in the continuous closed loop to pump said liquid therethrough, said means comprising a metering pump,

f. means responsive to the signal from the conductivity cell to show the conductivity of the liquid passing through the cell, and

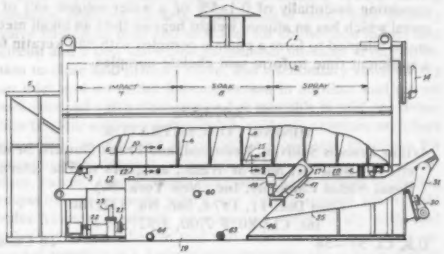
g. means responsive to the signal from the conductivity cell to provide a signal depicting the degree of conductivity of a liquid passing through the continuous closed loop at the conductivity cell, over a period of time, so that the conductivity over that period of time may be integrated.

3,973,573

SCRAP WASHING SYSTEM

Paul J. Seiwert, Cincinnati, Ohio, assignor to The MacLeod Company, Cincinnati, Ohio

Filed Oct. 31, 1974, Ser. No. 519,620
Int. Cl.² B08B 3/00
U.S. Cl. 134—63 **12 Claims**



1. A washing system for scrap metal parts contaminated with oil, grease and the like, comprising a rotary washing drum, means within said drum for washing the scrap parts with a liquid washing solution, and means for discharging used washing solution from the drum for reclamation, the used washing solution containing metal fines and contaminants removed from the parts being cleaned, an elongated recovery tank extending along one side of the drum, said tank having a leading end and a trailing end, an elongated inlet means for introducing washing solution discharged from said drum into the upper portion of said tank adjacent the leading end thereof, outlet means at the trailing end of said tank for withdrawing washing solution therefrom, whereby the washing solution flows through said tank from the leading to the trailing end thereof, means for establishing a predetermined solution level for said tank, a fines conveyor in said tank having perforated upper and lower flights traveling beneath said inlet means, scraper means mounted on said fines conveyor, the upper flight of said fines conveyor traveling toward the leading end of said tank in close proximity to the surface of the predetermined solution level for said tank, and said lower flight traveling along the bottom of said tank in the direction of the trailing end thereof with said scraper means positioned to dredge sludge from the bottom of the tank, said fines conveyor traveling upwardly through said tank between the trailing end of said lower flight and the leading end of said upper flight, a sludge receiving sump at the end of said lower flight, and sludge removing means in communication with said sump for removing sludge therefrom.

3,973,574

WAVING AND STRAIGHTENING HAIR BY PRODUCING METAL CHELATES IN THE KERATIN OF THE HAIR

Toyosaku Minagawa, deceased, late of Tokyo, Japan, by Motoi Minagawa, administrator; Yuzi Hazaka, Fujisawa, and Fumio Umezawa, Tokyo, both of Japan, assignors to Fumio Umezawa, Tokyo, Japan

Continuation of Ser. No. 100,539, Dec. 21, 1970, abandoned, which is a continuation-in-part of Ser. No. 596,391, Dec. 17, 1966, abandoned. This application Dec. 7, 1973, Ser. No. 422,710

Claims priority, application Japan, Nov. 25, 1965, 40-71974; Dec. 21, 1965, 40-79172; Jan. 11, 1966, 41-1455; May 4, 1966, 41-28168; Oct. 3, 1966, 41-65070

Int. Cl.[2] A45D 7/04

U.S. Cl. 132—7 8 Claims

1. A two-stage treatment for curling initially straight hair or straightening initially curly hair, which comprises arranging the hair in one of said curled or straight configurations different from the configuration of the untreated hair, soaking the hair so arranged with a first aqueous solution consisting essentially of 0.2–8% of at least one of a water-soluble organic amine, a water-soluble alkali metal hydroxide, a salt of an alkali metal, ammonium hydroxide or an ammonium salt having a pH of about 8–13 and while said hair is so soaked, soaking the still arranged hair with a second aqueous solution consisting essentially of 0.1–5% of a water-soluble salt of a metal which has an atomic weight heavier than an alkali metal and is adapted to form a chelate complex with hair keratin for a sufficient time to form said chelate complex.

3,973,575

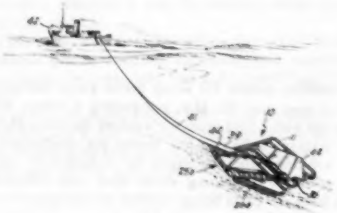
MINING CONCENTRATOR

Arthur Francis Sullivan, Redmond, and Frank Howard Brockett, III, Bellevue, both of Wash., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,780

Int. Cl.[2] E02F 7/00, 3/92, 3/94

U.S. Cl. 37—58 10 Claims



1. Undersea mining apparatus for obtaining a concentration of desired sizes of mineral aggregates from an undersea floor where the desired aggregates are dispersed in a mixture with other solid materials at the surface of the undersea floor comprising:

a. a vehicle structure including means for being moved in a forward direction on an undersea floor;

b. a rearwardly diverging horizontally fenestrated rejection sweep rigidly fixed to the vehicle structure, said rejection sweep comprising two rejection wings each having a plurality of rejection bars and a plurality of rejection bars supports holding the rejection bars in mutually parallel horizontal positions vertically spaced sufficiently apart to permit passage of desired aggregates, characterized by desired sizes, and sufficiently close to each other to reject passage of undesirably large solids, said rejection wings being fixed to the vehicle structure in the configuration of a rearwardly diverging vee with the apex pointed toward the forward direction and with an opening between the rearwardly diverging wings aft of the apex;

c. a rearwardly converging horizontally fenestrated collection sweep disposed behind the rejection sweep, said collection sweep comprising two collection wings each having a plurality of collection bars and a plurality of collection bar ribs holding the collection bars in mutually parallel horizontal positions vertically spaced sufficiently apart to permit passage of undesirably fine particles and sufficiently close to each other to prevent passage of desired aggregates, said collection wings being connected to the vehicle structure with a movable attachment means for providing vertically floating movability of the collection sweep wings in relation to the vehicle structure and for holding the collection wings in the configuration of a rearwardly converging vee having the opening between the wings of the vee located collection forward of the apex of the vee and with the forward opening between the collection sweep wings disposed behind the aft opening of the rejection sweep wings and between the rejection sweep wings and said collection sweep having a rearwardly open exit aft of said forward opening between the collection sweep wings; and

d. a liquid-solid flow transition chamber supported by the vehicle structure and disposed directly aft of the collection sweep exit, said chamber having a solids entrance facing forward toward the collection sweep exit, a water entrance facing aft and an exit port, said solids entrance and water entrance being disposed at least as high as the lowermost portion of the rejection sweep and said exit port being disposed higher than the solids entrance, said solids entrance and exit port being sufficiently open to enable passage of desired aggregates, and junction means for joining the exit port to a hydraulic suction conduit and for enabling upward suction of solids and water from the aforesaid solids entrance and water entrance.

3,973,576

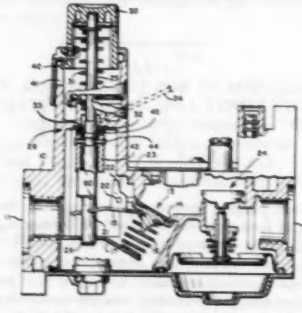
GAS VALVE WITH PILOT SAFETY APPARATUS

Paul Dietiker, and Norman F. Green, both of Los Angeles, Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 13, 1975, Ser. No. 549,593

Int. Cl.[2] F23N 5/10

U.S. Cl. 137—66 5 Claims



1. In a manually reset safety gas valve comprising,

a valve body having an inlet opening adapted to be connected to a supply of gas under pressure and an outlet opening adapted to be connected to a gas burner apparatus,

main valve means in said body connecting said inlet and said outlet openings, said valve means having a valve support member normally biased in a valve closed position,

a manually operated reset member mounted in said body for movement axially from a first position against a spring bias by force applied against an operating knob and for

rotation between on and off positions by turning said knob,

pilot valve means adapted to be connected to supply gas from said inlet to a burner pilot, said pilot valve means being normally biased to a closed position,

means connecting said reset member to said pilot valve means to open said pilot valve means upon movement of said reset member from said first position,

ignition safety means comprising a movable member operable in response to a flame to restrain said movable member when said movable member is moved from a first unrestrained position against a spring bias to a second position when a flame is present,

a latch member pivotally connected to said reset member and normally biased to a latching position, said latch member having a portion for engaging said movable member of said ignition safety means from said manually operated reset member is moved from said first position to move said movable member to said restrained position, said latch member having a second portion for connecting to said valve support member in a latching position to open said main valve only when said movable member is moved by said reset member and restrained in said second position and said reset member is subsequently released to partially return toward said first position, and

means associated with said latch member for releasing said valve support member when said operating knob is turned to an "off" position.

3,973,577

FLUID CONTROL VALVES

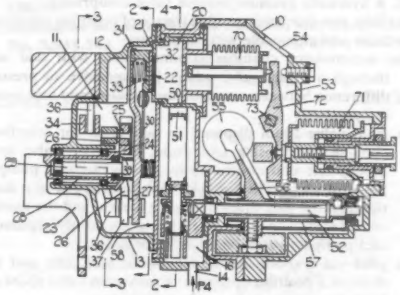
Joseph Louis Bloom, Droitwich, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Division of Ser. No. 485,423, July 3, 1974, abandoned. This application May 23, 1975, Ser. No. 580,411

Claims priority, application United Kingdom, July 9, 1973, 32667/73

Int. Cl.² F15B 5/00

U.S. Cl. 137—82 **21 Claims**



1. A fluid control valve arrangement comprising a body having an inlet and an outlet, a perforated port plate between said inlet and outlet, a control element of plate-like form co-acting with said port plate and being pivotally movable about an axis to progressively uncover the perforations in said port plate, the axis of pivotal movement of said control element being substantially perpendicular to the plane of said port plate, selector means movable to vary the position of said control element and an adjustable linkage means interconnecting said selector means and said control element, for varying the angular movement of said control element in response to a given movement of said selector means.

3,973,578

TANDEM CONTROL VALVE

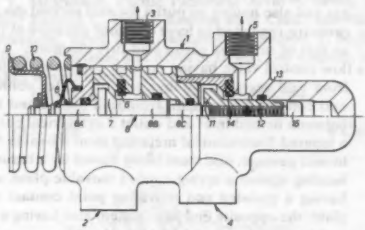
Helmüt Heibel, Moschheim, and Jorg Thielecke, Hillscheid, both of Germany, assignors to Girling Limited, Birmingham, England

Filed Feb. 19, 1975, Ser. No. 551,008

Claims priority, application United Kingdom, Feb. 20, 1974, 7803/74

Int. Cl.² B60T 8/22

U.S. Cl. 137—87 **6 Claims**



1. A pressure control valve for a braking system having separate pressure circuits, comprising a housing, a primary valve having an inlet and an outlet for connection in one said circuit and a first valve closure member movable in one direction to close said primary valve, and a secondary valve having an inlet and an outlet for connection in another said circuit and a second valve closure member movable in said one direction to close said secondary valve, said valve closure members are axially aligned and arranged for movement in unison for simultaneous opening or closing of said primary and secondary valves, said primary and secondary valves including respective valve seats which are axially spaced apart, said valve closure members co-operating respectively with said valve seats, and wherein said valve closure members are connected together in a manner permitting the adjustment of their axial spacing to correspond to the axial spacing of the valve seats.

3,973,579

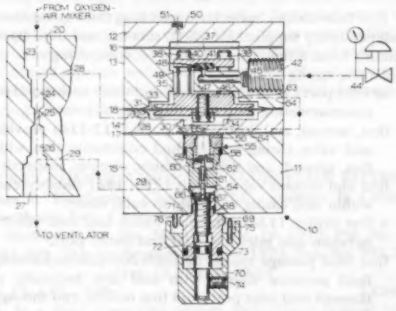
APPARATUS FOR CONTROLLING THE RATIO OF FLOW OF TWO GASES

Louis A. Ollivier, Palo Alto, Calif., assignor to Veriflo Corporation, Richmond, Calif.

Filed June 6, 1974, Ser. No. 476,956

Int. Cl.² G05D 11/03

U.S. Cl. 137—100 **5 Claims**



1. Apparatus for controlling the flow ratio of two gases, each having a separate supply, a first gas being subject to flow fluctuations and a second gas being added to said first gas in

a smaller volume than said first gas and at a constant ratio thereto, said ratio being adjustable, said apparatus including in combination:

a conduit for said first gas having a fixed orifice which is small in cross section relative to the remainder of said conduit,

a pressure regulator having a diaphragm defining two chambers, a first dead-end chamber connected to said conduit upstream from said orifice and at the same pressure, and a second chamber having an inlet valve controlled by said diaphragm and connected to the supply for said second gas and also having an outlet for said second gas at a flow pressure-regulated to have the same pressure at the outlet as that of said first gas in said first chamber,

a flow control valve having an inlet connected to the outlet from said second chamber and an outlet connected to said conduit downstream from said orifice and having in between its said inlet and outlet a cylindrical passage and a tapered frustoconical metering stem movable relatively to said passage, said stem being biased by a biasing spring bearing against a spring-carried movable plate, said stem having a rounded end providing point contact with said plate, the opposite end of said stem also having a rounded end to provide a point of contact, and

adjustment means for said flow control valve for manually setting the position of said stem relatively to said passage, said adjustment means comprising an adjustment screw having an end in point contact with said opposite end of said stem.

3,973,580

FLOW DIVIDER VALVE

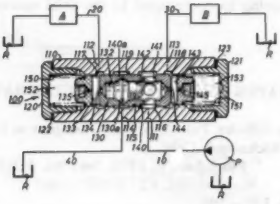
Atsumi Ueda, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed June 10, 1974, Ser. No. 478,045

Claims priority, application Japan, June 13, 1973, 48-66620

Int. Cl.[2] F16K 11/10

U.S. Cl. 137—101 **7 Claims**



1. A flow divider valve for controlling fluid quantities to be independently supplied into first, second, and third hydraulic circuits from a fluid pressure source, comprising:

a valve casing (110);

an inlet port (111) provided on said valve casing and in fluid communication with said fluid pressure source;

first, second, and third outlet ports (112-114) provided on said valve casing and in fluid communication with said first, second, and third hydraulic circuits, respectively;

first and second valve spools (130, 140) slidably disposed within said casing coaxially to each other;

a first orifice (134) provided within said first valve spool between said inlet port and said outlet port;

first fluid passage means permanently communicating said fluid pressure source with said first hydraulic circuit through said inlet port, said first orifice, and through said outlet port;

a second orifice (144) provided within said second valve spool between said inlet port and said second outlet port;

second fluid passage means permanently communicating said fluid pressure source with said second hydraulic circuit through said inlet port, said second orifice, and through said second outlet port;

first and second biasing means (150, 151) for biasing said first and second valve spools inwardly to engage the inner ends of said spools to each other;

a first throttle valve means (117) provided between said first outlet port and said first orifice within said first fluid passage means and throttling said first outlet port upon sliding movement of said first valve spool;

a second throttle valve means (118) provided between said second outlet port and said second orifice within said second fluid passage means and throttling said second outlet port upon sliding movement of said second valve spool; and

third fluid passage means communicating said fluid pressure source with said third hydraulic circuit through said inlet port and said third outlet port upon sliding movement of said first and second valve spools due to the pressure differences occurred by said first and second orifices.

3,973,581

HYDRAULIC PRESSURE CONTROL VALVE

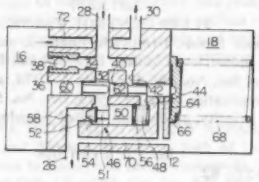
Keiichi Chiba, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 2, 1974, Ser. No. 494,358

Claims priority, application Japan, Aug. 8, 1973, 48-88513

Int. Cl.[2] G05D 16/10

U.S. Cl. 137—116 **13 Claims**



1. A hydraulic pressure control valve comprising:

an inlet communicating with a source of pumping pressure;

a drain communicable with said inlet;

an accumulator chamber communicable with said inlet through a check valve which is responsive to pressure difference between accumulator pressure and said pumping pressure;

a main valve spool disposed in said drain for selectively opening and closing said drain, said main valve spool having one end continuously exposed to said pumping pressure and another end continuously urged in a direction to close said drain by urging means, and the another end of said main valve spool being selectively exposed to said pumping pressure; and

a pilot valve spool disposed between said inlet and said drain at a position upstream of said main valve spool and responsive to said accumulator pressure;

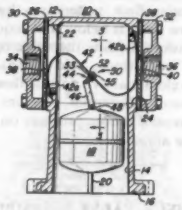
whereby when said accumulator pressure is below a predetermined value, said pilot valve spool is moved to a position to cause said pumping pressure to act on said another end of said main valve spool by which said main valve spool is moved to a position to close said drain by the force of said urging means and the force developed by said pumping pressure acting on said another end of said main valve spool so that said pumping pressure is admitted to said accumulator chamber through said check valve, whereas when said accumulator pressure is above the predetermined value, said pilot valve spool is moved to another position to prevent said pumping pressure acting on said another end of said main valve spool so that said main valve spool is moved to another position to open said drain.

3,973,582

FLEXIBLE BAND DEVICE

Howard E. Siebold, Libertyville, Ill., assignor to Liquid Controls Corporation, North Chicago, Ill.

Filed Mar. 10, 1975, Ser. No. 556,639
Int. Cl.[3] F16K *24/04*, *31/18*
U.S. Cl. 137—202 11 Claims



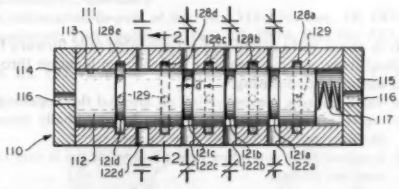
1. A device of the class described,
comprising
an elongated, resilient, flexible band,
guide means having spaced apart guide wall sections between which said band is disposed,
the distance between said wall sections being less than the length of said band,
spaced apart portions of said band being fixedly positioned relative to and against each of said wall portions,
the portion of said band intermediate the wall engaging portions forming two oppositely facing open loops,
said loops being open throughout an angle greater than one hundred eighty degrees, and
actuator means connected to the intermediate portion of said band at a fixed position thereon for rolling said band onto one of said wall sections and off of the other of said wall sections.

3,973,583

FLUID CONTROL SYSTEM

Gerald T. Sorenson, 3440 Nagawicka Road, Hartland, Wis. 53029

Continuation-in-part of Ser. No. 362,456, May 21, 1973, Pat. No. 3,938,543. This application May 16, 1974, Ser. No. 470,583
Int. Cl.[2] F16K *27/04*, *3/24*
U.S. Cl. 137—312 20 Claims



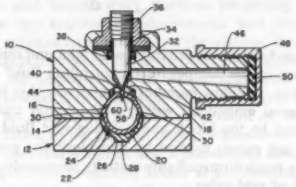
1. A normally blocked fluid control valve, comprising:
a. a valve body having an inlet port and an outlet port formed in a surface, and an unconstricted opening to exhaust means communicating with said surface, and
b. a valve member movable relative to said surface and including passage means for placing said inlet and outlet ports in fluid communication with each other in one position of said valve member relative to said body and for blocking fluid communication between said ports in another position of said valve member relative to said body,
c. said unconstricted opening to exhaust means communicating with said surface at a distance from said inlet port which is less than the length of any leakage path between said inlet and outlet ports,
d. said unconstricted opening to exhaust means communicating with said surface at a location where said passage means cannot place said opening into fluid communication with said inlet port when said valve member changes positions.

3,973,584

PIERCING VALVE FOR TAPPING PIPELINES

Eugene T. McKinnon, Pacific Palisades; Alvin S. Drutz, Los Angeles; Randall C. Danta, Reseda, all of Calif., and Niklas F. Zetterberg, Bend, Oreg., assignors to Eugene T. McKinnon, Pacific Palisades and Alvin S. Drutz, Los Angeles, both of Calif., a part interest to each

Filed Feb. 18, 1975, Ser. No. 550,704
Int. Cl.[2] F16K *43/00*, *51/00*
U.S. Cl. 137—318 4 Claims



3. In a line tap valve of the type having upper and lower blocks with registering grooves therein for assembly secured abutting and telescoping a normally circular transverse cross section pipeline to be tapped, the upper block mounting a generally vertically adjustable and peripherally sealed piercing needle selectively movable downwardly through a needle opening penetrating the upper block groove to transversely pierce an opening in an upper part of the pipeline, said needle then being movable back upwardly providing communication through the pipeline pierced opening and the needle opening into a transfer passageway of the upper block; the improvements comprising: said lower block groove being formed semi-circular in transverse cross section; said upper block groove being formed semi-elliptical in transverse cross section and having a lower portion formed with a radius greater than a radius of an upper portion of said groove with the surfaces of said groove upper and lower portions blending smoothly one into the other; said block grooves and said pipeline being respectively dimensioned so that said assembled securement of said blocks into abutment around said pipeline forces deformation of said pipeline against said blocks and totally conforming to said block grooves including said upper part of said normally circular cross section pipeline being deformed into and conforming to said upper block groove semi-elliptical transverse cross section to increase the rigidity of said upper part of said pipeline and avoid deformation of said upper part of said pipeline during piercing thereof by said downwardly moving piercing needle.

3,973,585

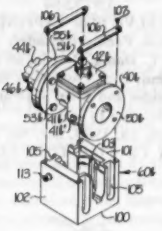
JACKET CONSTRUCTION FOR FLUID FLOW FITTINGS

James R. Henderson, Charlotte, N.C., assignor to Controls Southeast, Inc., Charlotte, N.C.

Division of Ser. No. 388,182, Aug. 14, 1973, Pat. No. 3,901,269. This application June 16, 1975, Ser. No. 587,122
Int. Cl.[2] F16K *49/00*
U.S. Cl. 137—340 2 Claims

1. In a fluid conveying system including a control valve having an irregularly shaped body through which a fluid flows, the combination therewith of jacket means substantially surrounding the body of said valve in close conformity and in heat-transferring relation thereto and cooperating with the

valve for directing a temperature-controlling fluid into heat-transferring relation thereto, said jacket means comprising an integral cast block of heat-conductive material having an inner face positioned adjacent and in heat-transferring relation to the irregularly shaped body of said valve, said block including inner and outer walls having therebetween a fluid passageway extending beneath and along opposite sides of the



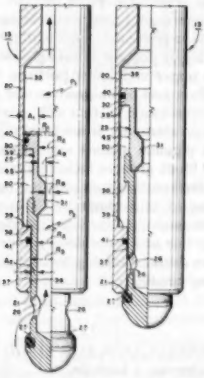
body of said valve and provided with inlet and outlet ports for circulation of the temperature-controlling fluid through the passageway, a hollow member of relatively thin heat-conductive material embedded within said integral cast block and surrounded by the block and defining said fluid passageway therein, and means carried by said block for positioning the same in a predetermined substantially surrounding relation to the body of said valve.

3,973,586

VELOCITY-TUBING PRESSURE ACTUATED SUBSURFACE SAFETY VALVE

Tom H. Hill, Pensacola, Fla., and Martin E. True, Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Apr. 16, 1975, Ser. No. 568,766
Int. Cl.[2] E21B *43/00*
U.S. Cl. 137—460 **10 Claims**



1. A subsurface safety valve for use in automatically closing off the flow of producing well fluids through well tubing comprising:

a valve housing;

a movable valve element connected to said valve housing and having one position which permits flow of fluids through said valve housing and another position which prevents flow of fluids through said valve housing;

said movable valve element and said valve housing forming an expansible-contractible chamber and larger and smaller differential areas;

an enlarged inner surface or flow bean arranged on said valve element causing a pressure differential across said flow bean when fluids flow through said valve housing;

said larger pressure area being above said flow bean and said smaller area being below said flow bean; and

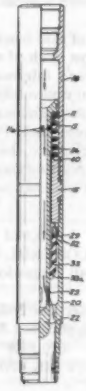
said flow bean being sized relative to said differential areas in any particular flow system so that the differential across said flow bean is below that required to overcome the pressure forces holding the valve open under normal flow velocity conditions, said valve closing upon increased flow velocity above normal flow velocity because of the increased differential pressure across said flow bean and decreased tubing pressure on said larger differential pressure area.

3,973,587

CHECK VALVE ASSEMBLY

Chudleigh B. Cochran, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Apr. 25, 1975, Ser. No. 571,609
Int. Cl.[2] E21B *43/00*
U.S. Cl. 137—496 **10 Claims**



1. A check valve assembly for permitting only forward flow of fluid from an upstream to a downstream location through said assembly comprising:

a. valve housing means having an internal flow opening;

b. valve member means extending longitudinally through the flow opening of said housing means;

c. longitudinally extending flow passage means in said valve member means;

d. outlet opening means in said valve member means for communicating said flow passage means with the internal flow opening of said housing means;

e. resilient sealing means for forming a seal between said housing means and said valve member means;

f. biasing means for urging said valve member and said sealing means relative to each other to a position in which said outlet opening means is upstream from said sealing means to prevent reverse flow through said flow passage means; and

g. opening means responsive to the application of fluid induced forces, acting from upstream to downstream and exceeding a predetermined minimum value, for moving said valve member and said sealing means relative to each other to a position in which said outlet opening means is

downstream from said sealing means to permit forward flow of fluid through said flow passage means.

3,973,588

AIR OUTLET VALVE FOR DIVING APPARATUS

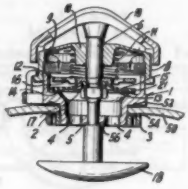
Rudolf Holst, Kastorf, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany

Filed May 5, 1975, Ser. No. 574,698

Claims priority, application Germany, May 14, 1974, 2423289

Int. Cl.² F16K *24/02, 15/18, 17/02*

U.S. Cl. 137—854 7 Claims



1. An air outlet valve for diving apparatus comprising a housing having an inlet, an outlet spaced from said inlet, and a flow passage in said housing extending from said inlet to said outlet, an interior annular valve seat defined within said housing across the flow passage, an actuation member having a shaft portion extending axially through said housing and an engageable outside and inside knob portion adjacent the respective ends of said shaft portion, journal means in said housing supporting said shaft for axial displacement of said actuation member, a flexible valve diaphragm in said housing having an annular valve seat engaging-sealing rim portion and being secured centrally to said shaft portion and engageable with said valve seat to close said flow passage, a pressure disk secured centrally to said shaft portion directly adjacent and on the outlet side of said diaphragm, spring means acting on said disk in a direction toward said valve seat causing said disk to press said outer rim portion of said diaphragm on said valve seat, said actuation member being displaceable to move said disk toward and away from said valve seat.

3,973,589

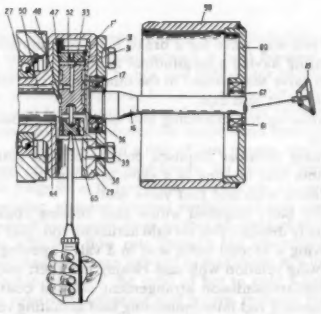
CONTROL VALVE

Günther Strauff, Kaarst, Germany, assignor to Langen & Co., Dusseldorf, Germany

Continuation-in-part of Ser. No. 316,396, Dec. 18, 1972, abandoned. This application Dec. 18, 1974, Ser. No. 533,787

Int. Cl.² F15B *13/14*

U.S. Cl. 137—596 1 Claim



1. In an adjustable control valve assembly for controlling an active, operative hydraulic fluid circuit of a servo steering system comprising, in combination: an elongated connection body having an axial bore therein,

said connection body including means in said axial bore for communicating with the active hydraulic fluid circuit of the servo steering system;

control means including an axial valve part axially disposed in said means for communicating with active hydraulic circuit and having rotation on the longitudinal axis of the connection body,

said control means including an enlarged portion projecting beyond one end of the connection body,

said enlarged portion including mutually parallel bore portions extending through said enlarged portion and spaced on opposite sides of the longitudinal axis of said connection body,

pistons in said bore portions including portions operatively connected to said means for communicating with the active fluid circuit, said control means including a portion having transverse enlargements intersecting the parallel bore portions, an activator journaled for rotation in said portion and having lever portions projecting laterally through the transverse enlargements and disposed in spaced relation from one end of the pistons, thrust members engaged between the lever portions and a respective piston, the improvement in which: said lever portions have screw-seats in alignment with the pistons and have means for permitting manual adjustment of the screw-seats relative to the parallel bore portions from the exterior of the enlargements, and a pot-shaped cover having an integral skirt projecting axially in surrounding relation to said enlarge portion and sealingly connected to said connection body, said cover including an aperture through which said activator projects, the interior of said cover communicating with the return line of the active hydraulic fluid circuit, means detachably connecting the cover to the connection body, said cover being displaceable axially on the activator from the connection body while the control means and hydraulic fluid circuit is operative to expose the enlarged portion of said control means and the parallel bores with the screw seats exposed for manual adjustment of the servo steering system.

3,973,590

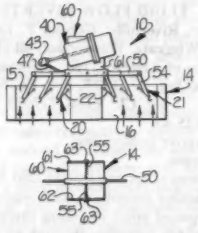
MIXING VALVE FOR AIR DISTRIBUTING SYSTEMS

Hillard Glenn Logsdon, Charlotte, N.C., assignor to Aeronca, Inc., Pineville, N.C.

Filed Feb. 1, 1974, Ser. No. 438,570

Int. Cl.² F16K *19/00*

U.S. Cl. 137—601 14 Claims



1. The improvement in a mixing valve for mixing airstreams in an air distributing system, said mixing valve including means defining first and second air passages therethrough, first and second louver means in the respective first and second passages and motive means operatively connected to said first and second louver means for moving the same so that one louver means is moved toward an open position as the other louver means is moved toward a closed position and vice versa, said improvement comprising means responsive to movement of either louver means toward and into closed position for exerting an opposing force thereon for aiding in subsequently moving the respective louver means in the oppo-

site direction against the force of an airstream impinging thereon.

3,973,591

MULTI-PORT CONTROL VALVE

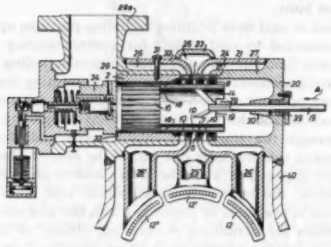
Hans Kalb, Nurnberg, Germany, assignor to AEG-Kanis Turbinenfabrik GmbH, Nurnberg, Germany

Filed Sept. 25, 1974, Ser. No. 509,051

Claims priority, application Germany, Oct. 4, 1973, 2350263

Int. Cl.² F16K 11/07

U.S. Cl. 137—625.12 7 Claims



1. In a control valve including a housing; means defining an inlet opening; an axially movable valve member formed of a hollow valve sleeve open at both ends; means defining a plurality of outlet ports arranged in an axial series parallel to the path of motion of the valve sleeve; a control land provided on the valve sleeve for sequentially opening the outlet ports upon motion of the valve sleeve in one direction; a rod attached to the valve sleeve and projecting outwardly of the valve housing for displacing the valve sleeve; the improvement wherein said means defining a plurality of outlet ports comprising a plurality of valve rings surrounding said valve sleeve and arranged in a series coaxial with said sleeve; each valve ring having a circumferentially extending, axially projecting extension engaging an adjoining one of said valve rings; each said axial extension having at least one discontinuity defining an outlet port between any two adjoining valve rings; and means for immobilizing said valve rings in said housing.

3,973,592

FLUID FLOW DIVERTER

John C. Cleaver, Riverhills; Gordon F. Leitner, Elm Grove, and Fred G. Wiegratz, Wauwatosa, all of Wis., assignors to Water Services of America, Inc., Milwaukee, Wis.

Filed Jan. 27, 1975, Ser. No. 544,567

Int. Cl.² F16K 11/083

U.S. Cl. 137—625.43 17 Claims

1. A fluid diverter comprising:

a. housing means,

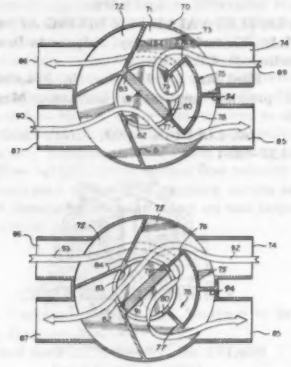
b. separator means for separating said housing means into one and another chambers, said separator means having angularly spaced apart openings therethrough,

c. a valve member rotatable through an angle in one chamber for controlling fluid flow selectively through said openings,

d. an inlet and outlet in said housing communicating with said openings,

e. means dividing said other chamber into subchambers, each of said subchambers having a port for being connected in a fluid flow path in which it is desired to reverse the direction of flow,

f. said valve member when in one angular position defining simultaneously two fluid flow paths, one being between said inlet and one port and the other being between said other port and said outlet, and when said valve member is in another angular position defining simultaneously alternate fluid flow paths, one being between said inlet



and said other port and the other being between said one port and said outlet.

3,973,593

TWO-WAY VALVE FOR A BRAKE BOOSTER

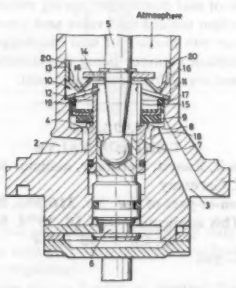
Ewald Müller, Neu-Isenburg, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Dec. 6, 1974, Ser. No. 530,339

Claims priority, application Germany, Feb. 26, 1974, 2409148

Int. Cl.² F16K 11/14

U.S. Cl. 137—627.5 3 Claims



1. A two-way valve for a brake booster comprising:

a housing having a longitudinal axis;

a first valve seat formed in the inner surface of said housing coaxial of said axis;

an actuating rod extending into said housing coaxial of said axis;

a closing member disposed coaxial of said actuating rod within said housing in a valve opening and valve closing relation with said first valve seat;

a valve body disposed within said housing coaxial of and axially displaceable on said actuating rod, said valve body having a second valve seat in a valve opening and valve closing relation with said closing member; and

a travel-transmission arrangement dispoed coaxial of said actuating rod interconnecting said actuating rod and said valve body to provide a larger displacement travel of said valve body relative to the displacement travel of said actuating rod;

said travel-transmission arrangement including

a first stop formed in the inner surface of said housing spaced longitudinally from said first valve seat;

a slotted disc spring disposed coaxial of said actuating rod having its outer periphery resting against said first stop and its inner periphery engaging said valve body at a point spaced longitudinally from said stop, said spring being slanted toward the actuated end of said actuating rod; and

a force-transmission means connected to said actuating rod abutting against said spring approximately midway of said inner and outer peripheries of said spring.

3,973,594

MIXING VALVE

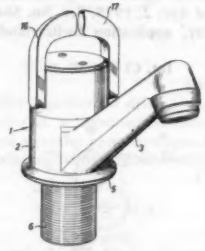
John Harry Gustafsson, Bromolla, and Tord Egron Henry Froberg, Kristianstad, both of Sweden, assignors to IFO AB, Bromolla, Sweden

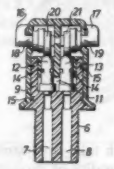
Filed Dec. 30, 1974, Ser. No. 537,205

Claims priority, application Sweden, Jan. 15, 1974, 7400480

Int. Cl.² F16K *19/00*

U.S. Cl. 137—637 **1 Claim**





1. In a hot and cold water mixing valve including a valve housing, a single outlet spout formed in said housing, means for connecting said spout to hot and cold water supply pipes, said means including separate hot and cold water valve seats normally closed by separate hot and cold water valve plugs, a pair of control levers positioned for single-hand operation and pivoted on said housing, and a pair of cam means, operated by pivoting respective ones of said levers, for moving respective ones of said plugs so as to open said valve seats, the improvement comprising, shaping contact surfaces of said cams and said plugs which move said plugs so that pivoting of each lever changes the effective flow rate through the associated valve seat from substantially zero upward to maximum in a logarithmic relationship whereby the ratio of hot to cold water flow, once set by relatively adjusting said levers, remains the same as both levers are thereafter simultaneously moved in the same direction through equal angular increments to adjust the rate of total water flow.

3,973,595

ARRANGEMENT FOR ACTUATING MECHANICALLY INDEPENDENT VALVES IN A PRESSURE FLUID SYSTEM

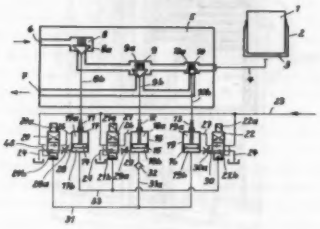
Heinz Schmoll, Heide, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Germany

Filed Dec. 12, 1974, Ser. No. 531,969

Claims priority, application Germany, Dec. 15, 1973, 2362431

Int. Cl.² F15B *13/043, 20/00*

U.S. Cl. 137—637.1 **3 Claims**



1. An arrangement for actuating at least first and second mechanically-independent valves in a hydraulic system and for providing a pressure-fluid interlock to ensure that one of the valves is fully closed before the other valve is opened, the arrangement comprising: first and second pressure-fluid piston-cylinder actuator units for actuating said first and second mechanically-independent valves, respectively, each said piston-cylinder unit having a cylinder chamber which, upon pressurization, causes the respective said mechanically-independent valve to open; first and second electromagnetically-actuated pilot valves for controlling the operation of said first and second piston-cylinder units, respectively; first and second pressure-fluid actuated blocking members for preventing the actuation of said first and second pilot valves, respectively; first fluid duct means interconnecting said first pilot valve and said chamber of said first piston-cylinder unit; second fluid duct means interconnecting said second pilot valve and said chamber of said second piston-cylinder unit; first control fluid duct means interconnecting said first blocking member and said chamber of said second piston-cylinder unit; and second control fluid duct means interconnecting said second blocking member and said chamber of said first piston-cylinder unit; whereby when said chamber of said second or first piston-cylinder unit is under substantial pressure, said first or second pilot valve respectively cannot be actuated to open said first or second mechanically-independent valve respectively in said hydraulic system, said hydraulic system further comprising a third mechanically-independent valve in addition to said first and second mechanically-independent valves, the arrangement further comprising: a third pressure-fluid piston-cylinder actuator unit for actuating said third mechanically-independent valve; a third electromagnetically-actuated pilot valve for controlling the operation of said third piston-cylinder unit; a third blocking member for preventing actuation of said third valve; third control fluid duct means interconnecting said third blocking member and said chamber of said first piston-cylinder unit; and further control fluid duct means interconnecting said first blocking member and said chamber of said third piston-cylinder unit, said further control fluid duct means incorporating a check valve preventing flow of pressure fluid through said check valve towards said chamber of said third piston-cylinder unit.

3,973,596

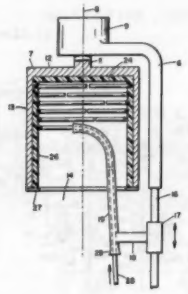
TUBULAR MEMBER AND PROCESS OF FORMING A TUBULAR MEMBER

Grant W. Walker, 4339 Lantzy Court, Sacramento, Calif. 95825

Division of Ser. No. 390,171, Aug. 20, 1973. This application May 22, 1974, Ser. No. 472,190

Int. Cl.[2] F16L *9/12*

U.S. Cl. 138—174 3 Claims



1. A tubular member comprising a wall of a predetermined diameter formed of a helix of fiber glass roving strips set end to end and embedded in a solid matrix, each of said strips having a length of the order of one-half said diameter.

3,973,597

SELVEDGE-FORMING DEVICE IN SHUTTLELESS WEAVING LOOMS

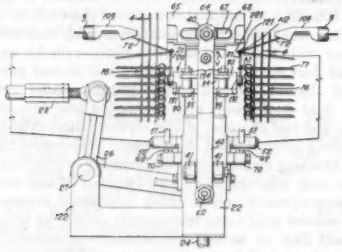
Adriano Gardella, 24B, Via al Capo di S. Chiara, Genoa, Italy (I-16146)

Filed Feb. 3, 1975, Ser. No. 546,617

Claims priority, application Italy, Feb. 14, 1974, 12476/74

Int. Cl.[2] D03D *47/42*

U.S. Cl. 139—431 3 Claims



1. A selvedge forming device for the formation of a selvedge in a shuttleless loom, comprising a warp shed a weft inserter, two selvedge forming needles and means for providing automatic operation of said needles in synchronism with the weft inserter, needles carrying shaft for fixedly mounting the selvedge forming needles in a substantially radial position, a selvedge forming head for rotatable mounting said needles carrying shaft, said selvedge forming head being slidably guided by the side of the warp threads and being so reciprocated as to be driven forward, in the direction of the path of movement of the weft inserter, and backwards synchronously with the movement of the weft inserter itself, means for rotating the needle-carrying shaft in one direction so as to angularly lift up the selvedge forming needle in correspondence with a terminal fraction of the forward stroke of the selvedge forming head and to turn the needle carrying shaft in the opposite direction, so as to angularly lower down the selvedge forming needles at the end of the forward run of the selvedge forming head, an arm formed integral with said needles carrying shaft, a return spring for maintaining said arm in an angular reset position corresponding to the lowered down position of the selvedge forming needles, a detent which cooperates with said return spring in such a manner that said arm is retained by the detent during the terminal fraction of the forward run of the selvedge forming head and is thus angularly shifted against the action of its respective return spring, whereby the needle carrying shaft is caused to be correspondingly turned, and the selvedge forming needles to be swung into the uplifted position thereof, and an abutment member disposed in the path of the weft inserting needles and provided with a slanting surface coacting with the point of the needles to lift the said abutment member whenever the needle point strikes against the said slanting surface of the abutment member, the said abutment member being connected to the said detent so as to lift the said detent out of engagement with the said arm of the needle carrying shaft each time that the said abutment member is lifted by the said weft inserting needles.

3,973,598

LOOM HAVING A CLOTH TAKE-UP SYSTEM

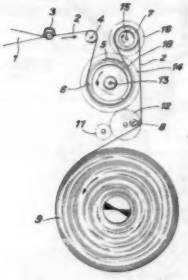
Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Apr. 2, 1975, Ser. No. 564,374

Claims priority, application Switzerland, Apr. 5, 1974, 4832/74

Int. Cl.[2] D03D *49/20*

U.S. Cl. 139—304 2 Claims



1. A loom having a cloth take-up system including a cloth take-up roller having a plurality of projecting needles on the periphery thereof for receiving a travelling length of cloth, a deflecting roller spaced from said take-up roller downstream thereof for passage of the cloth therearound, a cloth beam downstream of said deflecting roller for winding up of the cloth thereon and a gearing coupling said take-up roller and said deflecting roller together for driving said take-up roller and deflecting roller at a transmission ratio in which said deflecting roller has a greater peripheral speed than said take-up roller.

3,973,599

LOOM HAVING A CLOTH TAKE-UP SYSTEM

Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 19, 1975, Ser. No. 578,802

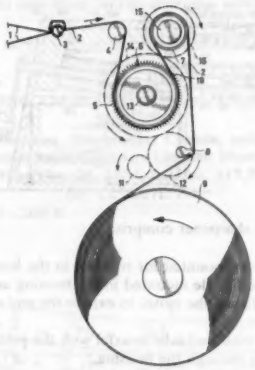
Claims priority, application Switzerland, May 24, 1974, 7093/74

Int. Cl.[2] D03D *49/20*

U.S. Cl. 139—304 7 Claims

1. A loom having a cloth take-up system including a cloth take-up roller for receiving a travelling length of cloth, a

deflecting roller spaced from said take-up roller downstream thereof for passage of the cloth therearound, a cloth beam downstream of said deflecting roller for winding up of the cloth thereon and a gearing coupling said take-up roller and



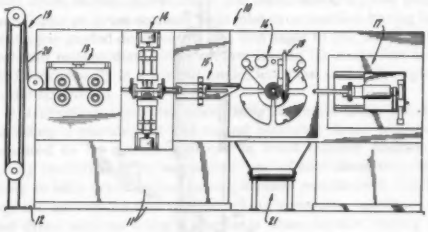
said deflecting roller together for driving said take-up roller and deflecting roller at a transmission ratio in which said deflecting roller has a greater peripheral speed than said take-up roller, said gearing including a friction clutch engaging said deflecting roller.

3,973,600

METHOD AND APPARATUS FOR FEEDING, CUTTING, STRIPPING, COILING AND TYING OFF ELONGATED FLEXIBLE MATERIAL

Robert L. Choromokos, 118 Edward St., Northlake, Ill. 60164

Filed Jan. 6, 1975, Ser. No. 538,555
Int. Cl.² B21F *3/00*
U.S. Cl. 140—1 **12 Claims**



1. In a method of forming coiled and tied lengths of elongated flexible material from continuous stock in a continuous process, the steps of

feeding elongated flexible material from a continuous stock into and through a cutting station,

cutting said elongated flexible material to thereby form a discrete length of said elongated flexible material,

winding said length of material into a multi-loop coil,

tying said multi-loop coil at a tying station, and

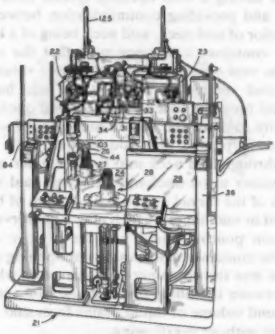
discharging said tied coil from the typing station.

3,973,601

APPARATUS AND METHOD FOR USE IN DEVELOPING WOUND COILS

Richard B. Arnold, and Larry W. Straley, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Mar. 5, 1975, Ser. No. 555,369
Int. Cl.² B21F *3/00*
U.S. Cl. 140—92.1 **17 Claims**



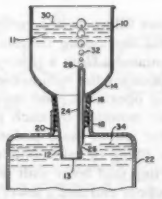
1. A method for use in developing at least two differently sized wound coils by relatively rotating wire dispensing means and at least one coil form part to generate turns of a first coil about the at least one coil form part, moving at least some of the turns of the first coil along gaps established by a coil turn receiver, relatively moving the coil receiver and at least one coil form part along a longitudinal axis, and generating at least some of the turns of a second coil about the at least one coil form part; the method comprising: applying a force from a prime mover to an energy storage device, and monitoring the relative rotational position of the wire dispensing means and at least one coil form part and generating signals indicative of the relative rotational position of the wire dispensing means and at least one coil form part; and initiating relative axial movement between the at least one coil form part and the coil receiver during a preselected portion of a preselected relative revolution of the at least one coil form part and wire dispensing means by applying a force from the prime mover and a force from the energy storage device to at least one of the relatively movable parts.

3,973,602

FUNNEL WITH SIGNAL

Frederick W. Kruse, Box 917 - R.D. No. 1, Oakdale, Pa. 15071

Continuation-in-part of Ser. No. 2,581, Jan. 13, 1970, abandoned. This application June 18, 1974, Ser. No. 480,985
Int. Cl.² B67C *11/00*
U.S. Cl. 141—95 **7 Claims**



1. In a system for filling a hollow container with liquid without overflowing, said container having imperforate walls with a generally circular filling opening and being of a size to receive a first volume of liquid; the improvement comprising

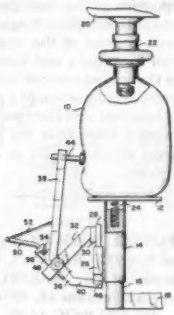
a funnel having a hopper with an open top, said hopper being of a size to receive a second volume of liquid which is less than the first volume of liquid received by the container, wall structure defining a generally cylindrical hollow neck having one end communicating with the interior of said hopper, the other end of said neck having a discharge opening for discharging liquid from said hopper, an annular seal mounted on the exterior of said neck and engageable with the filling opening of the container to form an airtight seal therewith, said wall structure having a vent opening spaced from said discharge opening and providing communication between the interior and exterior of said neck, said neck being of a length to extend into the container a distance such that the container space above the vent opening of the neck has a volume greater than said second volume of liquid within said hopper, whereby when said funnel is placed in the filling opening of the container with said annular seal in sealing engagement therewith and liquid is poured into said hopper, such liquid flows by gravity through said neck into the container and forces air in the container to be discharged through said vent opening in the neck of the funnel and rise as a stream of bubbles through the liquid in said hopper which may be observed and heard by the person pouring liquid into the hopper until the liquid within the container closes said vent opening to stop the flow of liquid into the container and thereafter when the engagement between the filling opening and said seal is interrupted said second volume of liquid drains from said hopper into the container without overflowing.

3,973,603

CONTROL FOR FILLING FLEXIBLE BOTTLES OR CONTAINERS

Henry H. Franz, 3201 Falls Cliff Road, Baltimore, Md. 21211

Filed June 18, 1974, Ser. No. 480,505
Int. Cl.² B65B *3/16*
U.S. Cl. 141—114 **8 Claims**



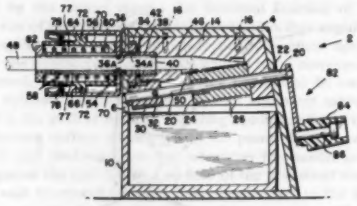
1. In a container filling device embodying a rotating turret with pedestals for supporting flexible containers during the filling of said containers from a reservoir having filling valves and means for adjusting the volumetric size of said containers during the filling operation, said means comprising; a cam member, a roller mounted on each pedestal and engagable with said cam for moving said pedestal away from a filling nozzle upon the filling of said container, a lever, means for pivotally supporting said lever with respect to said cam, said lever having an upper end and a lower end a plunger mounted in the upper end portion of said lever, said lower end of said lever having means thereon engagable by said roller for moving said plunger against said container to compress at least one side of said container contemporaneous with the removal of said container from said filling valve.

3,973,604

SINGLE CUTTER PENCIL SHARPENER

Walter B. Lincoln, Barnegat, N.J., assignor to Hunt Manufacturing Co., Philadelphia, Pa.

Filed July 14, 1975, Ser. No. 595,887
Int. Cl.² B43L *23/04*
U.S. Cl. 144—28.8 **5 Claims**



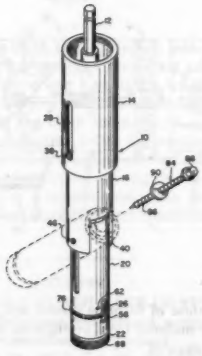
1. A pencil sharpener comprising:
a housing,
a single cutter mounted for rotation in the housing,
a fixed pencil guide mounted in the housing and having an opening facing the cutter to expose the end of a pencil to the cutter,
a rotatably mounted tube coaxial with the pencil guide and extending through the housing,
a gear concentric with said tube and secured to the outer periphery of the tube within the housing,.
means connected to the cutter and the gear to rotate the cutter and the gear simultaneously,
a sleeve mounted on the tube exterior of the housing for rotation therewith and having means to engage a pencil, and
a spring biasing the sleeve towards the housing to advance a pencil in the tube and in the pencil guide.

3,973,605

DRIVING TOOL BARREL ASSEMBLY

Charles J. DeCaro, Marshfield, Mass., assignor to Textron, Inc., Providence, R.I.

Filed Sept. 16, 1975, Ser. No. 613,756
Int. Cl.² B25B *23/10*
U.S. Cl. 144—32 R **13 Claims**



1. A barrel assembly suitable for connection to a fastener driving tool having a tool body and a driver comprising:
A. an outer sleeve adapted for attachment at one end to the tool body;

B. an inner sleeve retractably mounted to the outer sleeve so as to be retractable therein;

C. a barrel retractably and pivotally connected at a first end to the inner sleeve so as to be retractable therein and moveable from a first position in axial alignment with the inner sleeve into a second position in which there is access to a barrel bore through the first end;

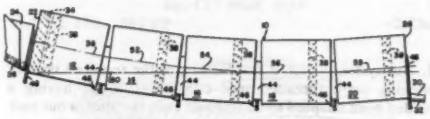
D. biasing means associated with the inner sleeve and the barrel to urge them into an extended position.

3,973,606

DEBARKING APPARATUS HAVING ANGLED DRUM SECTIONS

Marcel Carbonneau, Sherbrooke, Canada, assignor to Canadian Ingersoll-Rand Company Limited, Montreal, Canada

Filed Oct. 25, 1974, Ser. No. 517,893
Int. Cl.² B27L 1/02
U.S. Cl. 144—208 B 17 Claims



1. Debarking apparatus comprising a plurality of end-to-end rotatable drum sections mounted to be rotatably driven in fixed relative positions during operation of the apparatus, including means supporting at least one of said drum sections with its centerline angled relative to the centerline of another said drum sections, and causing said one drum section to have a different log-depth retention capacity than said another drum section, wherein there are at least three of said drum sections, one of said drum sections being an inlet drum section through which logs are introduced into the debarking apparatus, a second of said drum sections being a discharge drum section from which logs are discharged from the debarking apparatus, and a third of said drum sections being an intermediate drum section intermediate and interconnecting said inlet and discharge drum sections, said inlet drum section having its centerline angled downwardly at a first angle to the horizontal, and said intermediate drum section having its centerline angled downwardly at a second angle, less than said first angle, to the horizontal.

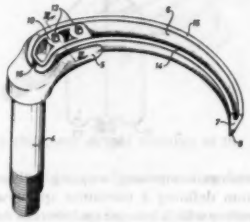
5. Debarking apparatus comprising rotatable drum means including a plurality of end-to-end rotatable drum sections mounted to be rotatably driven in fixed relative positions during operation of the apparatus, one of said drum sections being an inlet drum section having an inlet end through which logs are introduced into the debarking apparatus, another of said drum sections being a discharge drum section having a discharge end from which logs are discharged from the debarking apparatus, and a third of said drum sections being an intermediate drum section intermediate and interconnecting said inlet and discharge drum sections, including first means supporting said inlet drum section with its centerline angled downwardly at a first angle as it extends from its said inlet end, and including second means supporting said intermediate drum section with its centerline angled downwardly at a second angle, less than said first angle, as it extends from said inlet drum section toward said discharge drum section, wherein said first and second means comprising means for causing said one and another drum sections to have different log-depth retention capacities.

3,973,607

DEBARKING TOOL

Karl-Erik A. Jonsson, Gavle, Sweden, assignor to Brundell Och Jonsson AB, Gavle, Sweden

Filed Sept. 10, 1975, Ser. No. 611,875
Claims priority, application Sweden, Sept. 25, 1974, 7412070
Int. Cl.² B27L 1/00
U.S. Cl. 144—208 E 3 Claims



1. A debarking tool for debarking machines of the hollow rotor type, comprising a shaft pivot adapted to be rotatably carried by the rotor in parallel to the axis of the latter, an arm extending substantially radially from the shaft, and a debarking edge provided at the free end of the arm, characterized in that the arm is pressed integrally from a sheet of steel to the shape of a chute having its two borders and concave side therebetween turned onto the feed direction of a log to be debarked in the rotor, whereby said borders engage the fore end of a log supplied to transmit to the arm a torque in opening direction.

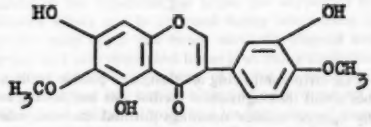
3,973,608

MICROBIAL PRODUCTION OF CERTAIN ISOFLAVONES

Hamao Umezawa; Tomio Takeuchi; Hideo Chimura, all of Tokyo; Tsutomu Sawa, Ayase, and Masa Hamada, Hoya, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

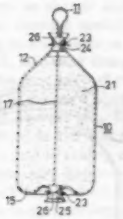
Division of Ser. No. 490,839, July 23, 1974. This application May 19, 1975, Ser. No. 578,709
Claims priority, application Japan, Aug. 1, 1973, 48-85884
Int. Cl.² C12D 9/00
U.S. Cl. 195—80 R 6 Claims

1. The process for the production of the compound having the formula



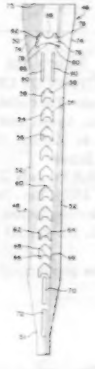
which comprises cultivating a strain of *Actinomyces roseolus* having the characteristics of strain A.T.C.C. 31047 at a temperature of about 25° to 35°C. for at least two days under submerged aerobic conditions in an aqueous assimilable carbohydrate solution containing an assimilable nitrogenous nutrient until a substantial amount of said compound is produced in said solution and then recovering said compound.

3,973,609
CONTAINER FOR MINIMIZING STRESSES
Gustaf Gerhard Lofberg, Landskrona, Sweden, assignor to Supra Aktiebolag, Landskrona, Sweden
Filed Apr. 29, 1975, Ser. No. 572,823
Claims priority, application Sweden, May 3, 1974, 7405935
Int. Cl.² B65D *33/14*
U.S. Cl. 150—1 **9 Claims**



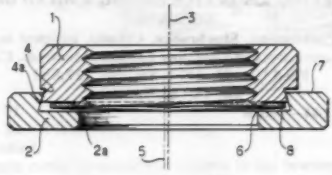
1. A container comprising a casing with an upper portion and a bottom defining a container space, and an elongate flexible member which has one end thereof anchored at a first anchoring point to said upper portion and the other end portion anchored at a second anchoring point to said bottom and which passes through the container space, wherein the elongate member extends longitudinally displaceably through an opening in said upper portion and is arranged to form a loop between said opening and said first anchoring point on said upper portion for receiving a container-lifting device.

3,973,610
TIE STRIP
Gene Ballin, 1 Elm St., Locust Valley, N.Y. 11560
Filed Oct. 20, 1975, Ser. No. 624,014
Int. Cl.² B65D *77/10*; **A45C** *13/00*
U.S. Cl. 150—3 **14 Claims**



1. A tie strip comprising an elongated pliable resilient strip flexible about its longitudinal medial axis and having longitudinally spaced similar openings formed therein, said strip having a slit therein disposed between adjacent openings and along the longitudinal axis of said strip, and at least one flexible resilient tongue registering with each of said openings and projecting generally longitudinally from an end edge of the respective opening and being integrally formed with said strip, wherein the strip is flexed along its longitudinal axis and passed through one of said openings to form a loop with the tongues of the openings along the advancing portion of the strip through said one opening sequentially bending the tongue of said one opening, and the tongue of said one opening resisting expansion of said loop by interlocking with the leading edge of the cooperating other opening.

3,973,611
NUT SYSTEM FOR LIMITING TIGHTENING
Christian Profit, Bordeaux, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France
Filed Feb. 24, 1975, Ser. No. 552,615
Claims priority, application France, Mar. 1, 1974, 74.07080
Int. Cl.² F16B *39/36*
U.S. Cl. 151—19 A **9 Claims**



1. Nut system which is self-locking at the required time of tightening on a threaded stud comprising a nut having a threaded bore adapted to be screwed onto the stud, a nut lock constituted by a washer having a non-threaded bore of greater diameter than the stud, said nut and washer being joined together for relative rotation with respect to each other and having interengaged surfaces of revolution that are rotatable relative to each other on said surfaces of revolution, said washer being situated axially on that face of the nut facing the direction of tightening on the stud, the axes of the bore of said nut and washer being offset relative to a common axis of said surfaces of revolution, an elastic part positioned between adjacent facing surfaces of the nut and washer tending to bias them apart in an axial direction so as to maintain frictional surface contact between the said surfaces of revolution whereby the nut and washer will rotate together in unison during tightenrotation of the nut on said stud, said washer being retainable against rotation on said stud, whereby when so retained a further minimal rotation of said nut in tightening direction on said stud effects relative rotation of said surfaces of revolution with respect to each other and thereby effects a lateral offset of the axis of said bores relative to the common axis of said surfaces of revolution and the exertion of a tightening lateral pressure of the nut against said stud to lock it in place thereon.

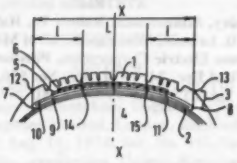
3,973,612
BREAKER STRUCTURES OF RADIAL TIRES
Mario Mezzanotte, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy
Filed July 12, 1974, Ser. No. 488,171
Claims priority, application Italy, July 23, 1973, 26906/73
Int. Cl.² B60C *9/20*
U.S. Cl. 152—361 FP **8 Claims**

1. A pneumatic tire for vehicle wheels comprising a radial carcass, a tread and a breaker structure wherein said breaker structure comprises:

-a. one strip of metal cords inclined with respect to equatorial axis of the tire at an angle ranging between 10° and 30°, said strip being so folded that a folding line is present at each lateral edge, said folded strip having a larger skirting of a width not smaller than that of the tire tread and two smaller skirtings, each of said smaller skirtings having a width ranging between 20% and 40% with respect to the width of said larger skirting;

-b. at least one layer of textile cords arranged in a direction parallel to the equatorial axis of the tire, the material of

said cords being such that it reduces in length when subjected to the action of heat, said layer being arranged in



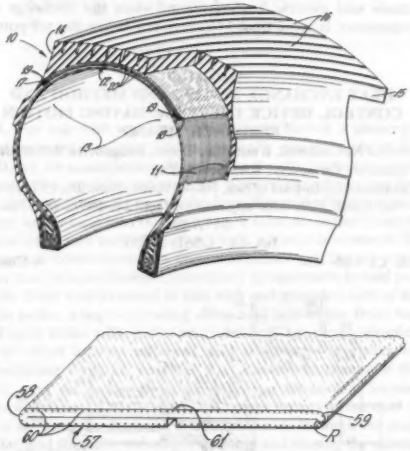
a radially outer position with respect to said metal cords and having a width smaller than the width of the larger skirting of said folded strip.

3,973,613

TIRE REINFORCEMENT

Alfred Marzocchi, and David E. Leary, both of Cumberland, R.I., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 12, 1974, Ser. No. 532,422
Int. Cl.² B60C 9/18
U.S. Cl. 152—361 FP **2 Claims**



1. In a pneumatic tire construction including a carcass, a tread connected to the carcass defining a pair of shoulders where the edges of the tread meet the carcass and a crown area extending from shoulder to shoulder, the improvement comprising at least one folded reinforcing belt within the crown peripherally circling the carcass beneath the tread, said belt containing a plurality of mutually parallel cords, said cords of said belt being positioned more closely adjacent to the outer surface of said belt at each fold than to the inner surface, the distance between said cords and said inner surface being sufficiently large to establish a predetermined radius of curvature of said cords at each fold in the belt.

3,973,614

VEHICLE VALVE-STEM RETAINING DEVICE

Gordon Joseph Taylor, 18 Seng St., Graceville, Queensland 4075, Australia

Filed Apr. 1, 1975, Ser. No. 564,151
Int. Cl.² B60C 29/00
U.S. Cl. 152—427 **4 Claims**

1. A detachable retainer for a cylindrical vehicle tire valve stem comprising;

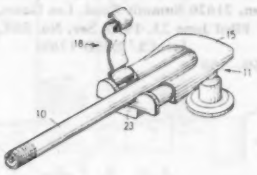
a substantially rectangular plastic retaining member having a thickness greater than the valve stem diameter;

said retaining member having upper and lower faces and opposite lateral sides,

said retaining member having a central longitudinal groove exposed at the upper face of said member to accomodate said stem below said upper face;

said groove extending partially along the length of said retaining member from one end towards the other,

said retaining member further having an aperture extending



through the thickness of said member at the rear of said groove;

a rear flange on said upper face extending forwardly over said aperture;

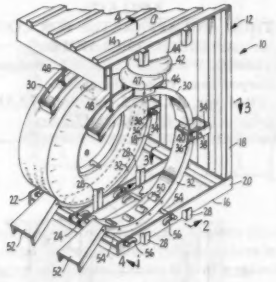
an elongated transverse spring-metal clamp pivoted at one end thereof to one side of said member to lie transversely across said groove to retain said stem therein and a lip on the opposite edge of said member over which the other end of said clamp can be sprung in clamping position.

3,973,615

APPARATUS FOR SEATING THE BEADS ON TUBELESS TIRES

Joseph J. Cunha, 24555 Palomares Road, Castro Valley, Calif. 94546

Filed Jan. 31, 1975, Ser. No. 546,002
Int. Cl.² B60C 25/12
U.S. Cl. 157—1.21 **9 Claims**



1. An apparatus for seating the beads on tubeless tires, said apparatus comprising: an upright framework; a lower jaw supported by said framework in a generally vertical plane and having a leading edge disposed proximate the lower forward extremity of the apparatus; an upper jaw supported by said framework above and in opposed facing relationship to the lower jaw, said upper jaw being vertically aligned with the lower jaw and said upper and lower jaws being conformed for engagement with the periphery of a tire received therebetween, said upper jaw having a leading edge disposed above and in spaced relationship to the leading edge of the lower jaw; means mounting at least one of the jaws for movement toward and away from the other, said at least one jaw being rigid and movable between an expanded condition wherein the leading edges of the jaws are vertically spaced from one another by a distance greater than the outside diameter of a tire to be treated by the apparatus to provide a vertically extensive laterally open unobstructed mouth through which such a tire may be rolled and a compressed condition wherein the jaws engage the periphery of a tire received therebetween;

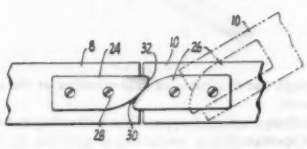
compression imparting means to selectively move said at least one of the jaws toward the other to forcibly engage the jaws with the periphery of a tire received therebetween; and means on the framework to maintain a tire received between the jaws in an upright position.

3,973,616

ALIGNMENT DEVICE FOR BI-FOLD DOORS

K. S. Jensen, 21620 Summit Road, Los Gatos, Calif. 95030

Filed June 23, 1975, Ser. No. 589,336
Int. Cl.² E05D 13/00
U.S. Cl. 160—199 2 Claims



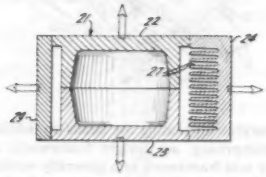
1. An alignment device for the meeting edges of bi-fold doors, wherein the top edge of each door is held on a track and the bottom edge of the mating doors are normally unguided, comprising a pair of wedge-like members which are 180° rotational images of each other and each mounted on a respective under surface of opposed mating doors, said wedges extending partly beyond the bottom corner edge of each door and said wedges bring the doors into alignment as the doors are closed and wedges engage each other.

3,973,617

METHOD AND APPARATUS FOR COOLING DIECASTING MOLD

Murray Berkowitz, Woodcliff Lake, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Apr. 28, 1975, Ser. No. 572,517
Int. Cl.² B22D 17/22
U.S. Cl. 164—113 6 Claims



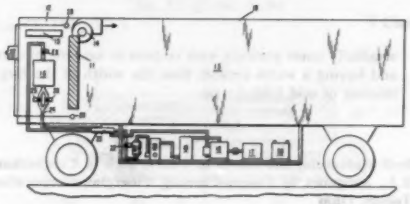
5. A method of automatically diecasting an article having a plurality of outwardly projecting cooling fins of extended area on a surface thereof, comprising in combination the steps of closing a die mold having a plurality of movable parts, at least one of said movable parts having a plurality of inwardly projecting fin-like portions of extended area to form the outwardly projecting cooling fins on the casting, filling the mold with molten casting metal under pressure, opening the mold to discharge the casting by retracting the movable die parts from each other, positioning a shroud member against the tip ends of the inwardly projecting fin-like portions of the die part to define coolant passages in the die part between said fin-like projections, positioning a coolant nozzle in communication with the passages, and discharging a coolant therefrom through the passages to cool the inwardly projecting portions.

3,973,618

ELECTRONIC CAPACITY CONTROL OR DIRECT EXPANSION REFRIGERATION OF AIR CONDITIONING SYSTEMS

Lowell B. Naley, Minnetonka; Robert W. Haberkorn, Edina, and Virgil D. Leinum, Minneapolis, all of Minn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 24, 1974, Ser. No. 536,055
Int. Cl.² F25B 29/00; F25D 17/06
U.S. Cl. 165—27 4 Claims



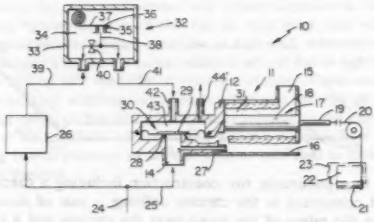
3. In an air conditioning system as set forth in claim 1, an electric heating means in said air tempering zone, and said thermostat having means, responsive to said first sensor, to actuate said electric heating means when the discharge air temperature is more than 1° Fahrenheit below the set point.

3,973,619

HEAT EXCHANGE SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR HAVING MOTION FEEDBACK MEANS

Edward N. Caldwell, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Continuation-in-part of Ser. No. 419,606, Nov. 28, 1973, Pat. No. 3,880,229. This application Oct. 24, 1974, Ser. No. 517,740
Int. Cl.² G05D 23/00
U.S. Cl. 165—34 6 Claims



1. A heat exchange system comprising a zone to be treated, a source of heat exchange output fluid for effecting a heat exchange function in said zone, a source of return fluid resulting from said output fluid providing its heat exchange function in said zone, thermally operated means for controlling the amount of flow of said output fluid from said source that is to be utilized for said heat exchange function in said zone in relation to the temperature of said thermally operated means, sensing means for sensing the temperature effect of said heat exchange function in said zone in relation to a predetermined temperature that said heat exchange system is to provide in said zone, and control means controlled by said sensing means for directing one of said output fluid and said return fluid to said thermally operated means to cause the same to change the amount of flow of said output fluid when said temperature effect in said zone deviates from said predetermined temperature a certain amount, said control means having means that causes said control means to operate said thermally operated means in a modulating manner, said means of said control

means comprising feedback means controlled by said thermally operated means and being operatively associated with said control means to provide for said modular operation of said thermally operated means.

3,973,620

AIR CONDITIONING SYSTEMS FOR MOTOR VEHICLES

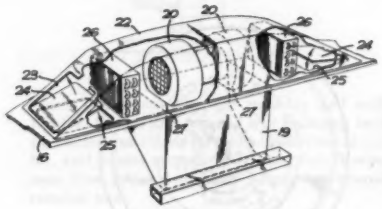
Roy Ernest Stringer, Birmingham, England, assignor to Chrysler United Kingdom Limited, London, England

Filed Aug. 19, 1974, Ser. No. 498,564

Claims priority, application United Kingdom, Aug. 24, 1974, 40321/74

Int. Cl.² B60H *3/04*

U.S. Cl. 165—42 **4 Claims**



1. For use with a motor vehicle body having a passenger compartment provided with a vertically extending front fire wall, an air-conditioning installation for the passenger compartment comprising an elongate plenum chamber extending along the outside of a part of the front fire wall of the compartment, an air inlet into the chamber, a main air outlet from the chamber in said part of the front wall, air-heater means in the passenger compartment in communication with the air outlet from the plenum chamber, subsidiary air apertures in said part of the front wall disposed in line with and on either side of the main outlet, a duct extending along said part of the front wall and open to the main outlet and subsidiary apertures, air inlets in the duct located adjacent said subsidiary apertures for introducing fresh air into the duct, air-cooler means in the duct, said air cooler means comprising air-coolers located adjacent the ends of the duct, air-blower means in the duct to draw air from the duct and discharge the air through the main outlet, and the valve means for opening and closing the subsidiary apertures and the air inlets in the duct to selectively provide a flow of fresh air through the duct into the passenger compartment and recirculation of air from the passenger compartment through the duct and back to the passenger compartment.

3,973,621

HEAT EXCHANGER

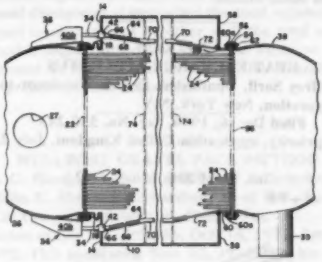
William James Bow, Morris Township, N.J., and Martin David Bernstein, Bronx, N.Y., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Nov. 27, 1974, Ser. No. 527,773

Int. Cl.² F28F *9/12, 5/00*

U.S. Cl. 165—83 **17 Claims**

1. A heat exchanger comprising a shell member, a pair of tube support members located at the respective end portions of said shell member, a plurality of tubes disposed within said shell and secured at their respective end portions to said tube support members, expansion means connecting one of said tube support members to said shell member while permitting relative movement therebetween, means cooperating with at least one of said members for applying a compressive preload to said tubes, means for passing a first heat exchange fluid through said tubes, and means for passing a second heat exchange fluid through said shell member in a heat exchange relation to said first heat exchange fluid.



3,973,622

TEMPERATURE-CONTROL SYSTEM WITH ROTARY HEAT EXCHANGERS

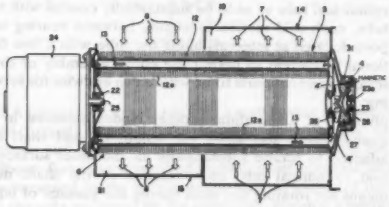
Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen, Germany

Division of Ser. No. 286,569, Sept. 5, 1972, Pat. No. 3,877,515, Continuation-in-part of Ser. No. 847,771, June 17, 1969, abandoned. This application Feb. 10, 1975, Ser. No. 548,673

Claims priority, application Germany, Jan. 22, 1964, 1426976; Jan. 22, 1964, 1221653

Int. Cl.² F28F *5/00*; F24H *3/06*

U.S. Cl. 165—86 **4 Claims**



1. A temperature-control system for a space provided with means for maintaining a first external fluid therein at a temperature differing substantially from that of a second external fluid in an adjoining environment, comprising:

a stationary support;

a structure rotatably mounted on said support, said structure including a first heat exchanger exposed to said first external fluid in said space and a second heat exchanger exposed to said second external fluid in said adjoining environment;

hermetically sealed conduit means in said structure interlinking said heat exchangers and forming a closed path for a heat-carrier medium abstracting heat from the warmer one of said external fluids and giving off heat to the colder one of said external fluids;

drive means coupled with said structure for rotating same about an axis; and

circulation means in said conduit means for propelling said medium therethrough, said circulation means including first blade means internally fixed to said structure, second blade means in tandem with said first blade means rotatably mounted in said structure, and coacting magnetic means on said support in operative relationship with said second blade means for restraining said second blade

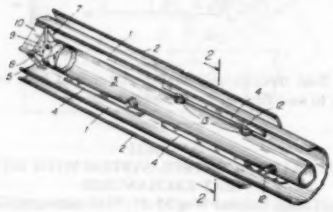
means against rotary entrainment by said structure, relative to said support thereby subjecting said medium in said path to relative rotary motion between said first and second blade means.

3,973,623

HEAT EXCHANGE APPARATUS

Peter Geoffrey Sarll, Upminster, England, assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 6, 1974, Ser. No. 530,243
Claims priority, application United Kingdom, July 2, 1974, 29283/74
Int. Cl.² F28G *15/08, 3/12*
U.S. Cl. 165—94 3 Claims



1. Apparatus for heat exchange treatment of a liquid having a mean density within a predetermined range, comprising:

at least one substantially horizontal cylindrical elongated tube with an inlet at one end thereof and an outlet at the other end thereof for flow of said liquid therethrough;

means for sweeping the outer surface of said cylindrical tube with fluid for conveying heat;

a hollow gas tight shaft having a plurality of tubular gas tight sections joined end to end rotatably supported within said cylindrical tube so as to be substantially coaxial with said tube, each said section extending between bearing supports located at intervals along the tube with a free frictional fit therein to permit the entire assembly of shaft, scrapers and supports to be withdrawn endwise for servicing;

a plurality of longitudinal scraper blades mounted in sequence upon and along the length of said shaft and adapted to scrape substantially all the inner surface of said cylindrical tube upon rotation of the shaft; drive means for rotating the shaft during the passage of liquid through said cylindrical tube;

and wherein the weight per unit length of tube, of said liquid displaced at maximum mean operational temperature thereof by said shaft and scrapers amounts to at least ninety percent of the weight per unit length of tube of said shaft and scrapers whereby the load in said bearing supports is minimized and uniform scraping action is achieved as the scraper blades bear against all the exchanger surface with substantially equal force.

3,973,624

CONDENSER

Lars Bratthäll; Erik Henriksson, and Lars Olof Ingesson, all of Linköping, Sweden, assignors to Stal-Laval Apparat AB, Linköping, Sweden

Filed Mar. 25, 1974, Ser. No. 454,434
Claims priority, application Sweden, Apr. 6, 1973, 7304858
Int. Cl.² F28B *9/10*
U.S. Cl. 165—114 5 Claims

1. A condenser for a gaseous media such as steam and the like, comprising:

a. a shell defining a condensing chamber and having an inlet for the gaseous media;

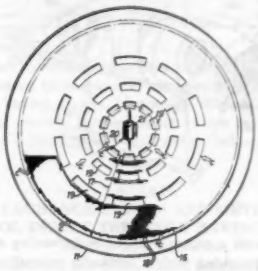
b. a tubular structure comprising a maze of tubes arranged in nest-like formation within said shell for passing a coolant media from an inlet end to an outlet end in said condensing chamber;

c. a plurality of passages for passing the gaseous media in heat exchange relationship with said coolant media as the latter flows from said inlet end to said outlet end and defining a cold end and a warm end between which ends the condensing capacity fluctuates in proportion to fluctuations in temperature as the gaseous media is condensed on the tubes;

d. said tubular structure comprising a peripheral condenser portion and an air cooler for evacuating non-condensable gases surrounded by and located substantially centrally within said peripheral portion and being spaced therefrom by said gas media passages;

e. said passages being effective to pass the gaseous media from said peripheral condenser portion towards said air cooler;

f. brace means supporting said tubular structures within said shell;



g. said brace means having flow channels for the gaseous media and being free of obstruction by the tube and being arranged at selected locations effective to distribute the gaseous media about said condenser portion and said air cooler in response to fluctuations in condensing capacity as the coolant media is passed from the said cold end to said warm end;

h. said air cooler comprising a tube nest precooling portion with a centrally located longitudinal drum for evacuation of non-condensable gases spaced from and surrounding a recooling portion;

i. said recooling portion comprising wall means spaced from the drum and surrounding tubes, the wall means and tubes having gaps therebetween and defining an inlet portion for the passage of the gaseous media to the evacuation drum; and

j. said cooling portions forming an open construction and being arranged so that adjacent tubes are flushed by condensate from remote tubes.

3,973,625

UNDERWATER CONNECTION APPARATUS

Benton F. Baugh, Houston, Tex., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.

Division of Ser. No. 386,431, Aug. 7, 1973, Pat. No. 3,866,977.
This application Nov. 22, 1974, Ser. No. 526,309
Int. Cl.² E21B *43/01*
U.S. Cl. 166—.6 9 Claims

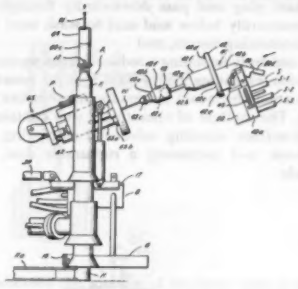
1. A removable seal connector for providing fluid connection between two underwater flowlines, comprising:

a first flowline terminating in a first flowline flange and a second flowline terminating in a second flowline flange and mount means mounting said first flowline flange for movement toward and away from said second flowline flange;

a removable seal assembly for releasable, sealable attachment to said first flowline flange, said removable seal

assembly including means for engaging said second flowline to provide a sealed, fluid connection between said first and second flowlines; and

a removal tool adapted for lowering downwardly underwater to said removable seal assembly for positioning between said removable seal assembly and said second flowline flange, said removal tool including latch means for latching said removal tool to said removal seal assembly, said mount means moving said first flowline flange away from said seal assembly is freed for removal by said removal tool.



3,973,626

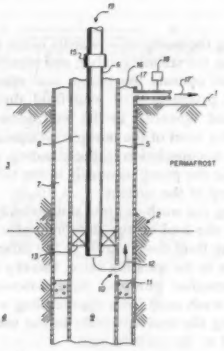
WELL COMPLETION IN PERMAFROST

Leon H. Miles, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sept. 24, 1975, Ser. No. 616,257

Int. Cl.² E21B *21/00, 43/00, 47/00*

U.S. Cl. 166—250 **4 Claims**



1. A method for displacing a known volume of freezable liquid from a permafrost zone of a wellbore and replacing said freezable liquid with an essentially nonfreezable liquid under the conditions present in said permafrost zone of said wellbore, comprising providing an essentially nonfreezable liquid of known water content and solids content, providing monitoring means which is sensitive to changes in both water and solids and which has been calibrated against said nonfreezable liquid when uncontaminated with additional water or solids and when contaminated in a known manner, displacing freezable liquid with said nonfreezable liquid by introducing said nonfreezable liquid into said wellbore and recovering freezable liquid returns at the earth's surface, at least periodically during said displacing process monitoring changes in water and solids content of said liquid returns and determining therefrom the total amount of water returned at any given time, during said displacing process measuring the volume of nonfreezable liquid introduced into said wellbore, and terminating said displacement step when the total volume of freezable liquid in said returns together with the total volume of nonfreezable liquid introduced into said wellbore indicates displacement to the desired extent of the freezable liquid initially present in said wellbore.

3,973,627

WELLBORE GRAVEL PACK METHOD

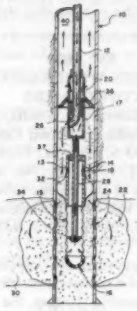
William C. Hardy, Richardson; Edward F. Schultze, Dallas, and John C. Shepard, Richardson, all of Tex., assignors to Sun Oil Company (Delaware), Dallas, Tex.

Division of Ser. No. 189,856, Oct. 18, 1971, Pat. No. 3,800,875. This application Nov. 12, 1973, Ser. No. 415,451

The portion of the term of this patent subsequent to May 28, 1991, has been disclaimed.

Int. Cl.² E21B *43/02*

U.S. Cl. 166—276 **5 Claims**



1. A process for gravel packing a well having an unconsolidated formation comprising: locating an aggregate in the wellbore and in the unconsolidated formation adjacent the wellbore; flowing a controlled melting point material into the area occupied by the aggregate; flowing an excess of fuel gas into the area occupied by the aggregate; burning a portion of the fuel gas to heat the area occupied by the aggregate to a temperature in excess of the melting point of the controlled melting point material, the excess of gas assisting in transferring heat to the controlled melting point material; and terminating the burning to allow the controlled melting point material to solidify.

3,973,628

IN SITU SOLUTION MINING OF COAL

Stirling A. Colgate, Ward, Colo., assignor to New Mexico Tech Research Foundation, Socorro, N. Mex.

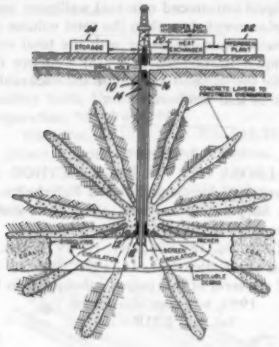
Filed Apr. 30, 1975, Ser. No. 573,244

Int. Cl.² E21B *43/26;* **E21C** *41/04*

U.S. Cl. 166—283 **15 Claims**

15. A method of liquefying coal in situ in an underground coal seam by hydrogenation thereof comprising the steps of supplying an hydrogenating solvent for the coal to the coal seam, maintaining the hydrogenating solvent in the coal seam at a pressure below the overburden stress of the underground strata and a temperature sufficiently high and a time sufficiently long to hydrogenate a selected volume of the coal in the coal seam and fracturing the underground strata around and in the coal seam with said selected volume of hydrogenated coal, said hydrogenated coal being a fluid at a tempera-

ture maintained in the coal seam and settable at a temperature in the strata around the coal seam, thereby to seal the bound-



ary of the coal seam to contain a hydrostatic pressure in the coal seam in excess of the overburden stress.

3,973,629

INJECTION PROFILES WITH RADIATION INDUCED COPOLYMERS

Bruce L. Knight, 713 Hawthorne, Findlay, Ohio 45840; John S. Rhudy, 6642 S. Ogdin, Littleton, Colo. 80121, and William B. Gogarty, 7643 S. Race St., Littleton, Colo. 80122

Filed Nov. 6, 1972, Ser. No. 303,743

The portion of the term of this patent subsequent to Mar. 25, 1992, has been disclaimed.

Int. Cl.[2] E21B *33/13, 43/00*

U.S. Cl. 166—295 **20 Claims**

1. A process of improving the injectivity profile and/or vertical conformance of a subterranean formation containing at least one highly permeable stratum, the process comprising injecting into the formation having an injection well in fluid communication with at least one production well and displacing therethrough an aqueous solution comprised of a copolymer obtained as a product of radiation polymerization of at least one monomer selected from the group consisting of acrylamide and methacrylamide and at least one monomer selected from the group consisting of acrylic acid, methacrylic acid, alkali metal acrylate, and alkali metal methacrylate in concentration of about 10% to about 60% by weight total dissolved monomer in an aqueous medium, the radiation intensity being about 250 to about 1,000,000 rads/hr. and the radiation dose being about 500 rads to about 300,000 rads, the polymer having sufficient property to reduce the permeability of the highly permeable stratum but permitting sufficient permeability to obtain displacement of at least a substantial portion of the aqueous solution through the formation to the production well.

3,973,630

WASH-OUT TOOL AND METHOD OF USE THEREOF

Virgil C. Wheeler, Long Beach, and Harry D. Sharrett, Van Nuys, both of Calif., assignors to Seaboard Oil & Gas Co., Los Angeles, Calif.

Filed May 22, 1975, Ser. No. 580,013

Int. Cl.[2] E21B *37/00, 21/00*

U.S. Cl. 166—312 **13 Claims**

1. In a standing valve wash-out tool adapted to be landed on sand containing means,

a. a vertically elongated tubular body,

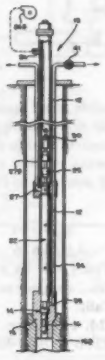
b. elastomer cup means on the body to engage a well tubing bore as the body travels lengthwise within said bore in response to fluid pressure exertion on the cup means exteriorly of the body,

c. the body having a fluid pressure inlet above the cup means, there being a frangible plug within the body blocking fluid pressure flow downwardly through the body,

d. a seat on the body proximate the lower end thereof to land on said sand containing means, whereby application of sufficient fluid pressure within the body will rupture said plug and pass downwardly through the body and outwardly below said seat to wash sand from said sand containing means, and

e. said body including a reduced cross-section lower projection extending below said seat to penetrate said sand containing means for conducting pressure fluid thereinto.

13. The method of operating a well containing tubing and a sub-surface standing valve and employing a pump and a wash-out tool containing a rupturable disc, the steps that include



a. traveling the pump downwardly in the tubing, landing the pump on the standing valve; and pumping fluid down the tubing to operate the pump, said operation resulting in upward production of well fluid through the standing valve and upwardly in the well outside the tubing and above the level of the pump, said operating also resulting in sand accumulation in the standing valve,

b. traveling the pump upwardly in the tubing and retrieving the pump at the surface,

c. traveling the wash-out tool downwardly in the tubing and landing the tool on the standing valve,

d. pumping fluid downwardly in the tubing to build up fluid pressure in the standing valve, thereby to rupture the disc, and thereafter pumping fluid downwardly through the tool to wash sand from the standing valve,

e. traveling the tool upwardly in the tubing and retrieving the tool at the surface, and

f. again traveling the pump downwardly in the tubing, landing the pump on the valve and operating the pump as aforesaid.

3,973,631

METHOD AND DEVICE FOR EXTINGUISHING FIRES IN OIL WELLS

Uriel Hefetz, P.O. Box 6037, Jerusalem, Israel

Filed Jan. 31, 1975, Ser. No. 546,128

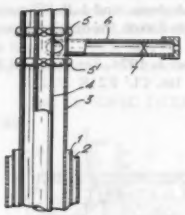
Claims priority, application Israel, Feb. 5, 1974, 44142

Int. Cl.[2] E21B *29/00;* **A62C** *3/04*

U.S. Cl. 169—46 **12 Claims**

1. A method of extinguishing fires in oil wells having an inner pipe and an outer pipe separated by an annular space comprising the steps of:

a. inserting a plurality of drills at equal radial distances in the wall of the outer pipe to center the inner pipe;
b. continuing drilling with said drills to extend through the wall of the inner pipe, the bit tips of the drills being of such angles that their sum is equal to 360° and their diameter being of such dimensions that they form chords which extend over the entire inner circumference of the



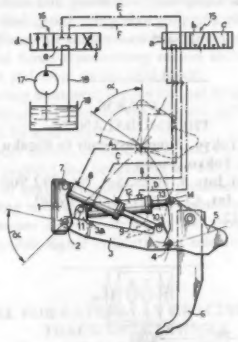
inner pipe whereby the interior of the inner pipe is covered;
c. attaching an offset pipe which includes a valve to extend outwardly from the outer pipe and below the drills;
d. providing through said offset pipe a bore in the wall of the outer pipe and
e. inserting means for closing the annular space between the inner pipe and the outer pipe through said offset pipe.

3,973,632

RIPPER FOR TRACTORS AND SIMILAR VEHICLES

Franco Torazzi, Turin, Italy, assignor to Gimac S.p.A., Torinese-Turin, Italy

Filed June 4, 1975, Ser. No. 584,080
Claims priority, application Italy, June 6, 1974, 68778/74
Int. Cl.² A01B *13/08, 63/10, 63/102*
U.S. Cl. 172—474 **3 Claims**



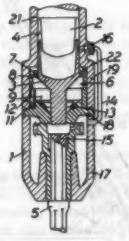
1. In a scarifier or ripper device of the type comprising;
a support structure attachable to a tractor or like vehicle,
an arm pivotally attached at one end thereof to said support structure,
a tool-carrying frame pivotally attached to the other end of said arm said tool-carrying frame carrying at least one scarifier or ripper tool,
at least one elevation control fluid pressure actuator interconnecting said fixed support structure and said arm whereby to control, upon extension and retraction, the elevation of said arm with respect to said fixed support structure,
at least one attitude control fluid pressure actuator connected to said tool-carrying frame, and operable upon extension and retraction to control the inclination of said tool-carrying frame, and therefore the inclination of said scarifier or ripper tool with respect to said arm, and
a main control fluid pressure distributor device operable selectively to supply fluid under pressure to said fluid pressure actuators and to connect them to a reservoir whereby selectively to cause extension or retraction thereof, the improvement comprising,
an auxiliary fluid pressure distributor device connected between said fluid pressure actuators and said main control distributor, said auxiliary distributor having three selectable positions, that is:
a. a first position wherein said auxiliary distributor connects said elevation control actuator and said attitude control actuator in series whereby fluid displaced from one of them is fed to the other in such a way that one retracts when the other extends;
b. a second position wherein said auxiliary distributor isolates and blocks said elevation control actuator and connects said attitude control actuator to said main control distributor whereby to obtain independent control of the inclination of said tool-carrying frame with respect to said arm; and
c. a third position wherein said auxiliary distributor isolates and blocks said attitude control actuator and connects said elevation control actuator to said main distributor whereby to obtain independent control of the inclination of said arm while said tool-carrying frame is held in a fixed inclination with respect thereto;
the relative diameters of said elevation control actuator and said attitude control actuator being such that said tool-carrying frame is turned by said attitude control actuator with respect to said arm by an angle which is equal to the angle turned by said arm with respect to said fixed support structure upon displacement of said elevation control actuator when said auxiliary distributor is in said first position whereby to obtain parallelogram-type movement.

3,973,633

HAMMER DEVICE

Kurt Osten Brannstrom, Saltsjo-Boo, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Continuation of Ser. No. 368,023, June 8, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,370
Claims priority, application Sweden, June 30, 1972, 8600/72
Int. Cl.² E21B *21/00*
U.S. Cl. 173—75 **12 Claims**



1. A hammer mechanism for use with a tool having channel therein, the hammer mechanism having a normal working mode of operation and a continuous flushing mode of operation, comprising:
a machine housing (1) having a working chamber (4) therein;
a driving piston (2) which is reciprocably movable in the machine housing (1);

means coupled to said driving piston for reciprocably moving said driving piston (2) in the machine housing (1) to create a pressure-gas cushion in the working chamber (4);

a hammer piston (3) in the housing (1) and which is arranged to be driven towards a tool (5) by the driving piston (2) via said pressure-gas cushion in the working chamber (4) and being selectively movable to a resting position at an extreme end position in the housing to define said continuous flushing mode, said extreme resting position being outside the normal range of operation of the driving piston (2) when the hammer mechanism is operating in said working mode;

means (14) for transferring pressure-gas from the working chamber (4) to a channel (15) in the tool (5);

the hammer piston (3) including cut-off means cooperating with the pressure-gas transferring means (14) for selectively turning on and cutting off the pressure-gas transference during the normal working mode of operation of the hammer mechanism, the hammer piston (3) cutting off the pressure-gas transference to the tool channel (15) during a major portion of the working stroke of the hammer piston;

means including a damping chamber (6) cooperating with and stopping the hammer piston (3) in said extreme resting position during the continuous flushing mode of operation; and

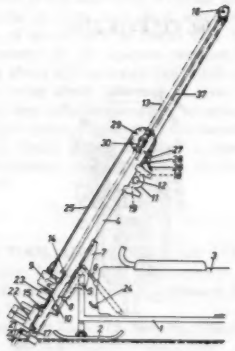
means including said hammer piston cut-off means for rendering the pressure-gas transferring means (14) in continuous communication with the tool channel (15) and the working chamber (4) when the hammer piston (3) is in said extreme resting position so that the pressure created in the working chamber (4) by the driving piston (2) generates a flushing flow of pressure gas to thereby provide said continuous flushing of the tool channel (15).

3,973,634

DEVICE FOR FEEDING A REEL ALONG A TRACK

Jan Edvard Persson, Nacka, and Sven Axel Ekman, Saltsjobaden, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Sept. 27, 1973, Ser. No. 401,439
Claims priority, application Sweden, Oct. 6, 1972, 12987/72
Int. Cl.² E21C 5/06
U.S. Cl. 173—147 **5 Claims**



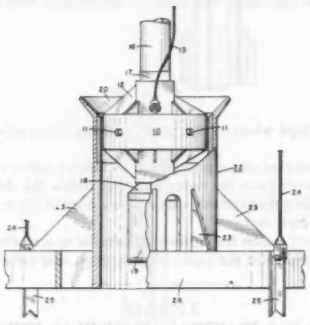
1. A device for driving a reel for a power supply conduit along a feed beam for a drilling machine, comprising a slide guided by the feed beam and carrying the reel, and a driving chain connected to the drilling machine, said slide comprising a sprocket which partly cooperates with the driving chain and partly is operatively connected to a device stationarily arranged along the feed beam for cooperation therewith in order to drive the reel with half the speed of the drilling machine, said stationarily arranged device comprising a chain and said slide comprising a guiding channel for the driving chain.

3,973,635

METHOD AND APPARATUS FOR OFFSHORE DRILLING OPERATIONS

John M. Gatlin, San Antonio, and J. P. Pittman, Houston, both of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Dec. 2, 1974, Ser. No. 528,764
Int. Cl.² E21B 7/12
U.S. Cl. 175—7 **17 Claims**



1. An apparatus for use in offshore drilling operations, comprising:

a. a drill string;

b. a guide base for receiving said drill string;

c. tool means for running said guide base to the ocean floor on said drill string, said tool means being supportable on and movable along said drill string and including means for releasably engaging said guide base; and

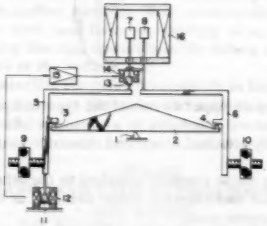
d. means for moving said tool means upwardly along said drill string.

3,973,636

THERMOBALANCE

Hiroshi Uchida, Tokyo, Japan, assignor to Rigaku Denki Company Limited, Tokyo, Japan

Filed July 3, 1975, Ser. No. 592,900
Int. Cl.² G01G 1/18, 19/00
U.S. Cl. 177—132 **5 Claims**



1. A thermobalance comprising a main balance provided with fulcra respectively at the tips of both arms, a pair of auxiliary balances suspended respectively on said fulcra, arms of said auxiliary balances extended near to a vertical line passing through the fulcrum of said main balance and fitted respectively with a sample container and standard sample

container at the tips and balancing means provided respectively on the auxiliary balances, said sample container and standard sample container being parallelly placed within the same furnace.

3,973,637

PRECISION BALANCE WITH RESILIENTLY MOUNTED WEIGHING PAN

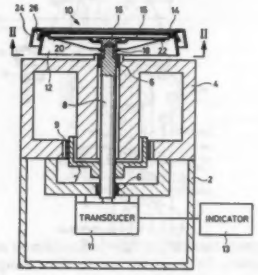
Peter Kunz, Meilen, Switzerland, assignor to Mettler Instruments AG, Greifensee-Zurich, Switzerland

Filed Sept. 24, 1975, Ser. No. 616,425

Claims priority, application Switzerland, Apr. 15, 1975, 4780/75

Int. Cl.² G01G 21/22

U.S. Cl. 177—189 **4 Claims**



1. Weighing apparatus comprising:
a. a support;
b. a pan carrier member;
c. guide means on said support for guiding movement of said carrier member in a vertical direction;
d. a weighing pan;
e. force transmitting means operatively interposed between said weighing pan and said carrier member for transmitting a force from said weighing pan to said carrier member, said force transmitting means including a resilient element yieldable under said force;
f. cooperating abutment means on said weighing pan and on said support for limiting the resilient deformation of said element by said force;
g. transducer means connected to said carrier member and to said support for generating an electrical signal in response to said movement of said carrier member; and
h. indicating means conductively connected to said transducer means and responsive to said signal for generating a perceptible signal indicative of said force.

3,973,638

STRUCTURE FOR LATERALLY BRACING AN ENDLESS TRACK OF A VEHICLE

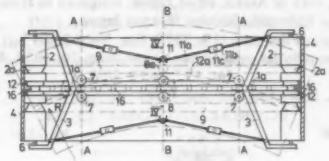
Jorma Toivo Tapani Pohjola, Haravatie 6, 90530 Oulu 53, Finland

Filed Jan. 21, 1975, Ser. No. 542,844

Int. Cl.² B62D 55/10

U.S. Cl. 180—9.46 **8 Claims**

1. In a vehicle, a vehicle body, front and rear rolls, endless track means extending around said front and rear rolls, a pair of frame means connected with said body and said rolls for supporting said body thereon, at least one of said frame means being connected to said body for turning movement around a substantially upright axis, said one frame means also being connected with one of said rolls for turning with the latter while said one frame means turns around said upright axis when the vehicle executes a turn, said endless track means having opposed sides one of which becomes longer and the other of which becomes shorter when the vehicle executes a turn and said endless track means having a longitudinal central portion situated between said opposed sides thereof, and guide means carried in part by said body and in part by said longitudinal central portion of said endless track means for guiding and laterally bracing said endless track means during execution of a turn, a part of said guide means which is carried by said body being located closely adjacent to said upright



axis, the latter upright axis having a fixed position with respect to the remainder of the vehicle and said part of said guide means which is closely adjacent to said upright axis being situated close enough thereto to remain substantially uninfluenced by said endless track means during execution of turns and said guide means being connected only between said body and said endless track means.

3,973,639

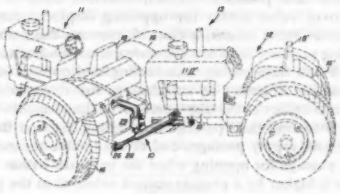
COUPLER FOR DETACHABLE CONNECTING TWO SINGLE AXLE DRIVEN TRACTORS AS A SINGLE FOUR WHEEL DRIVE VEHICLE

Solomon Lan Stewart, Elfrida, Ariz., assignor to John W. Mangum, Elfrida and George D. Stephens, IV, Douglas, both of Ariz., part interest to each

Filed Jan. 13, 1975, Ser. No. 540,649

Int. Cl.² B60D 1/00

U.S. Cl. 180—14 R **12 Claims**



1. Coupling means for detachably connecting the rear of a first front wheelless rear axle driven tractor with the front of a second front wheelless rear axle driven tractor for forming a four wheel drive vehicle comprising:
an elongated shaft for mounting laterally of the longitudinal axis of the rear of a first front wheelless rear axle driven tractor,
said shaft being provided with bearing surfaces at each end thereof for being supported by the ends of a pair of spacedly arranged tie bars mounted on the rear of said first tractor and extending rearwardly therefrom,
said shaft having an arm mounted thereon a first portion of which extends laterally thereof in substantially a vertical plane when the coupler interconnects two tractors and a second portion integral with the end of said first portion and extending laterally therefrom for attachment to the rear tractor along its longitudinal axis,
said first portion supporting in pivoted relationship therewith a collar mounted around its outer periphery,
and a connecting arm extending laterally of the longitudinal axis of said collar for fixedly connecting to the wheel mounting of the second tractor,

means for limiting the longitudinal movement of said collar along said first portion of said arm,

said second portion of said arm and said connecting arm are arranged in parallel planes.

3,973,640

POWER STEERING APPARATUS FOR A VEHICLE

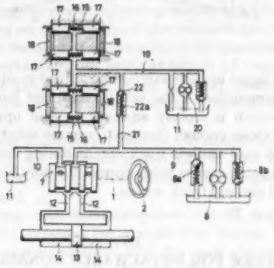
Masao Nishikawa, Niiza; Yoshihiko Toshimitsu, and Takashi Aoki, both of Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,819

Claims priority, application Japan, Aug. 20, 1974, 49-94595

Int. Cl.² B62D *5/08*

U.S. Cl. 180—132 **7 Claims**



1. Power steering apparatus comprising a turnable steering shaft, an operational pressure fluid source, a power cylinder having left and right chambers, a supply passage connected to said source, movable changeover valve means coupled to said steering shaft for selectively connecting the left and right chambers to said source by way of said supply conduit depending on the direction of turning of the steering shaft, at least one fluid pressure reaction chamber coupled to said changeover valve means for opposing displacement of the changeover valve means, a control pressure fluid source for supplying pressure fluid at a pressure corresponding to vehicle speed, a first fluid passage connecting said control source to said reaction chamber to supplement the resistance of the reaction chamber to the displacement of the changeover valve means, a second fluid passage connecting the first fluid passage to said supply passage, and control valve means in said second passage for opening when the pressure within the first passage is higher by a predetermined value, than the pressure within the supply passage.

3,973,641

ANTI-THEFT DEVICE FOR MOTOR VEHICLES

Leslie C. Barker, 2659 E. 75th St., Chicago, Ill. 60649

Filed Apr. 25, 1975, Ser. No. 571,583

Int. Cl.² B60R *25/04*

U.S. Cl. 180—114 **4 Claims**

1. In a motor vehicle ignition system including a voltage source, an ignition switch, spark plugs, a distributor, and conductive leads operatively connecting the same in a motor-starting circuit,

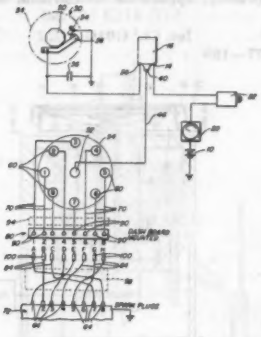
a theft-deterrent security assembly obviating any need physical to remove from the vehicle any vehicle ignition system component thereof so as to prevent theft of the vehicle,

said theft deterrent security assembly constituting a connection-scrambling device for interposition, electrically, between said spark plugs and said distributor to provide code-governed and code-dependent connector means constituting an effective impediment to any unauthorized starting and use of the vehicle, irrespective of ignition switch actuation,

said connection-scrambling device comprising a first array and a second array of interrelated coded connectors, each array having the same number of functional terminal contacts for pairing, manually, in a one-to-one relationship,

first electrical leads interconnecting each of said contacts of said first array with a corresponding electrical terminal of said distributor,

second electrical leads interconnecting each of said contacts of said second array with a corresponding one of said spark plugs at an electrode thereof,



contacting means for establishing electrical continuity between each of a given one of said coded connectors of said first array with each of a given one of said coded connectors of said second array,

code designation and identification means to ensure that connections between connectors of said first array and connectors of said second array are made only in a predetermined, unique, one-to-one pattern, which pattern alone establishes an operative ignition circuit,

all elements of said assembly remaining at all times in the vehicle.

3,973,642

NOISE-REDUCING BLOWING NOZZLE

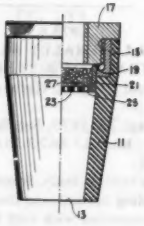
Lars Christer Dahlquist, Atvidaberg, Sweden, assignor to Sunne Gummifabrik AB, Sunne, Sweden

Filed Apr. 1, 1975, Ser. No. 564,082

Claims priority, application Sweden, Apr. 5, 1974, 74046087

Int. Cl.² F01N *5/00*

U.S. Cl. 181—36 A **9 Claims**



7. A nozzle for ejecting compressed air, comprising a tapering rubber tube, a metal sleeve vulcanised to the inside of the wide end of said rubber tube, an air supply conduit nipple threaded into said sleeve, a cup-shaped perforated bowl inserted in said rubber tube end and applied with a rim portion

against said sleeve, and a body of porous material held by said bowl.

3,973,643

DETACHABLE HARNESS FOR FIREMAN'S COAT AND THE LIKE

Jack M. Hutchinson, 900 W. Stetson St., Orlando, Fla. 32804

Filed Dec. 30, 1974, Ser. No. 537,100
Int. Cl.² A62B *35/00*
U.S. Cl. 182—3 **11 Claims**

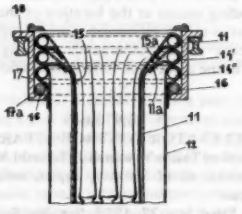
1. A harness in combination with a garment comprising:
a garment adapted to fit about the torso of a wearer;
a belt adapted to encircle the waist of the wearer;
means for rapidly joining and releasing the opposite ends of said belt;
a strap having two ends and carried by said belt at one end between the ends of said belt, said strap adapted to extend between the legs of said wearer of said garment;
means for rapidly joining and releasing the other end of said strap with the joined ends of said belt; and
means for holding part of said strap in a stored position against the inside of said garment when not in use, leaving one end thereof free to facilitate removal of said strap from said stored position.

3,973,644

RESCUE APPARATUS

Gérard Zéphinié, Paris, France, assignor to Societe Soberal S.A., Luxemburg

Filed June 5, 1973, Ser. No. 477,071
Claims priority, application France, June 6, 1974, 74.20410
Int. Cl.² A62B *1/20*
U.S. Cl. 182—47 **6 Claims**



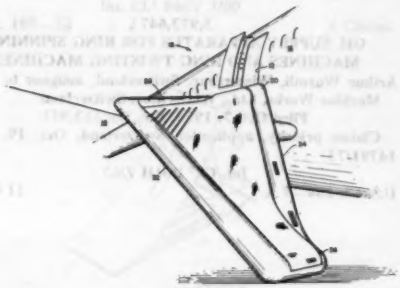
1. An apparatus for slowing the rate of descent of a falling body being evacuated from an elevated point to a point therebelow, comprising
1. a flexible tubular device having two open ends, one end substantially at the level of the elevated point and the other end substantially at the level of the point therebelow, the tubular device extending substantially vertically from the elevated point to the point therebelow and being elastic in the transverse and circumferential but substantially inextensible on the longitudinal direction thereof,
2. a thermal protective tubing surrounding the tubular device and consisting of heat-resistant material; and
3. a longitudinally pleated tube arranged coaxially between the thermal protective tubing and the tubular device.

3,973,645

INFLATABLE EVACUATION SLIDE

Earl E. Dix, Colts Neck, and William H. Fischer, Wall, both of N.J., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 15, 1975, Ser. No. 605,140
Int. Cl.² B65G *11/10*; A62B *1/20*
U.S. Cl. 182—48 **6 Claims**



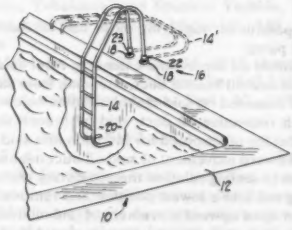
1. Inflatable slide apparatus for evacuation from an elevated egress of an aircraft to a lower surface upon which the aircraft is at rest where the egress is located near an aircraft wing, comprising:
a fluid distensible beam structure generally including five beam sections in fluid communication with each other to form a generally pentagonal beam structure;
a sliding surface operably affixed to the generally pentagonal fluid distensible beam structure;
means to deploy the fluid distensible beam structure and sliding surface from the elevated egress to have a portion of the pentagonal beam structure supported by the aircraft wing and one of the five pentagonal beam sections disposed on the lower surface upon which the aircraft is at rest.

3,973,646

LADDER FOR SWIMMING POOLS, AND THE LIKE

Rudolph J. Martinez, North Royalton, Ohio, assignor to Portable Pool Covers, Inc., Berea, Ohio

Continuation-in-part of Ser. No. 343,355, March 21, 1973, abandoned. This application Mar. 4, 1974, Ser. No. 447,554
Int. Cl.² E06C *9/08*
U.S. Cl. 182—97 **4 Claims**



1. An article permanently connecting a ladder to a fixed structure, said article comprising pivoting means connecting one end of said ladder to said fixed structure, a first portion

of said pivoting means attached to said ladder, a second portion of said pivoting means attached to said structure, means pivotally connecting said first and second portions of said pivoting means, and locking means for securing said first and second portions of said pivoting means to thereby prevent pivoting of said ladder, said locking means comprising flat abutting surfaces on said first and second portions of said pivoting means, said flat surfaces locatable to selectively lock said ladder in a plurality of positions with respect to said fixed structure, said means pivotally connecting said first and second portions including means providing substantial lineal movement of said portions of the pivoting means relative to each other in addition to said pivotal movement, whereby said ladder is capable of pivoting perpendicular to said structure into a plurality of stable positions with respect to said structure depending on the operation of said locking means.

3,973,647
OIL SUPPLY APPARATUS FOR RING SPINNING MACHINES AND RING TWISTING MACHINES

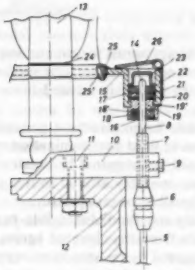
Arthur Wurmli, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Oct. 7, 1974, Ser. No. 512,951

Claims priority, application Switzerland, Oct. 19, 1973, 14791/73

Int. Cl.² D01H 7/62

U.S. Cl. 184—7 A **11 Claims**



1. In combination with a ring spinning or twisting machine having a machine frame, at least one ring rail movably mounted relative to said machine frame for guiding of the running rings with the travellers thereon, and an oil duct in communication with a respective ring rail for supplying oil thereto;

an apparatus for supplying oil to said oil duct comprising

an oil pump,

a common oil supply line extending from said pump,

at least one oil branch duct extending from said supply line and mounted on said machine frame below and adjacent each respective oil duct, said oil branch duct having an outlet for oil disposed for insertion into said oil duct upon downward movement of said oil duct over said oil branch duct in sealing relation thereto during movement of said ring rail into a lowest position and removal from said oil duct upon upward movement of said oil duct from said oil branch duct during movement of said ring rail toward a highest position, and

a metering means in said oil branch duct for metering oil therethrough.

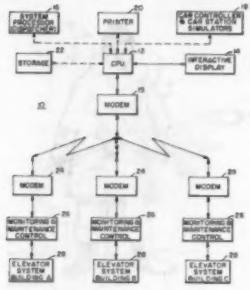
3,973,648
MONITORING SYSTEM FOR ELEVATOR INSTALLATION

George T. Hummert, Oakmont; Thomas D. Moser; David M. Edison, both of Murrysville, all of Pa., and Marvin Kurland, Old Bridge, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1974, Ser. No. 510,821

Int. Cl.² B66B 3/00

U.S. Cl. 187—29 R **11 Claims**



1. A monitoring system for remotely monitoring an elevator installation, comprising:

an elevator system including at least one elevator car, and means for operating said elevator car,

monitoring means located remotely from said elevator system,

means operable from the location of said monitoring means for selectively establishing a communication link between said elevator system and said monitoring means,

means associated with said elevator system for sending status signals to said monitoring means over said communication link, said status signals being serial, digital data words responsive to predetermined parameters of said elevator system,

said monitoring means including decoding means for decoding the serial data words, and processing means responsive to said decoding means for presenting the information in a predetermined form,

control means associated with the monitoring means for initiating predetermined commands to be executed by the elevator system,

means for sending command signals to said elevator system over the communication link, with said command signals being serial, digital data words responsive to the commands entered by said control means,

and decoding means at the location of the elevator system responsive to the elevator command signals, said decoding means routing commands entering by said control means to the associated functions of said elevator system.

3,973,649
ELEVATOR CONTROL APPARATUS

Tatsuo Iwasaka; Takeo Yuminaka; Takashi Kaneko, and Hiroshi Kinoshita, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1975, Ser. No. 544,274

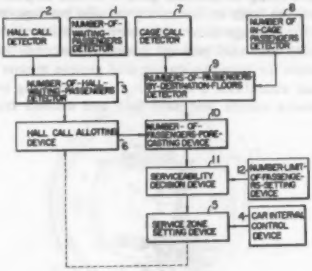
Claims priority, application Japan, Jan. 30, 1974, 49-11818; Feb. 15, 1974, 49-17566; Mar. 25, 1974, 49-32578

Int. Cl.² B66B 1/18

U.S. Cl. 187—29 R **17 Claims**

1. An elevator control apparatus whereby a plurality of elevator cars serve a plurality of floors in accordance with the hall calls and cage calls registered in hall call registration means provided on the respective floors and cage call registra-

tion means provided in said cars, respectively; said apparatus comprising means for detecting the numbers of passengers in each of said cars for destination floors; said number-of-passengers-for-destination-floor detector means including means for detecting the number of passengers in said car, means for



setting the ratio at which the number of passengers in said car is allotted to the floors associated with said registered cage calls, and means for allotting the number of passengers in said car to the floors associated with the cage calls at the set allotment ratio.

3,973,650

MECHANICAL ENERGY ABSORBING DEVICE AND SAFETY HARNESS USING THE SAME

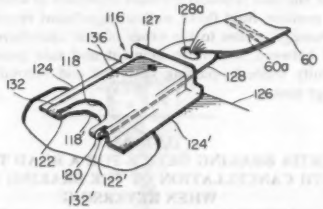
Yasuo Nagazumi, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 323,262, Jan. 12, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,814

Claims priority, application Japan, Jan. 12, 1972, 47-476710[U]; Jan. 12, 1972, 47-476711[U]; Jan. 12, 1972, 47-476712[U]

Int. Cl.² F16F 7/12

U.S. Cl. 188—1 C **2 Claims**



1. An energy absorbing device comprising:

a member having first and second longitudinal parallel portions extending in a common direction from a return-end portion;

a structure of which said member forms a part, said structure comprising a pair of side reinforcement wall portions which are integral with said first longitudinal portion, a cross reinforcement wall portion which is integral with said first longitudinal portion at a lateral edge of said structure opposite to said return-end portion and notches formed at both sidewise ends of said return-end portion;

wherein, during application of a force in said direction to said second longitudinal portion and an opposite force to said side reinforcement wall portions, said first longitudinal portion shears from said side reinforcement wall portions and successive parts of said return-end portion adjacent said second longitudinal portion plastically deform to become parts of said second longitudinal portion and successive parts of said first longitudinal portion plastically deform to become parts of said return-end portion.

3,973,651

VEHICLE CHOCK

Kenneth John Garrett, Chesham, and Ronald Denis Fox, Amersham, both of England, assignors to Humphrey Thompson Enterprises Limited, Pinner, England

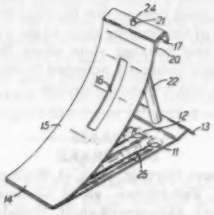
Continuation-in-part of Ser. No. 341,090, March 14, 1973, Pat. No. 3,871,492. This application Nov. 4, 1974, Ser. No. 520,887

Claims priority, application United Kingdom, Mar. 15, 1972, 12096/72; France, Mar. 15, 1973, 73.09238; Germany, Mar. 15, 1973, 2312833; Mar. 15, 1973, 7309791[U]; Canada, Sept. 16, 1974, 209271

The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.

Int. Cl.² B60T 3/00

U.S. Cl. 188—32 **4 Claims**



1. A chock for a vehicle wheel comprising, in combination:

a. a first substantially rigid plate engageable with a roadway;

b. a second flexible plate overlying the first plate;

c. first and second ends to each of said plates;

d. means securing said plates together at said first ends;

e. a removeable member spacing the second end of the second plate away from the second end of the first plate;

f. two rows of holes punched in the first plate, the rows both being perpendicular to the length of the first plate; and

g. a plurality of downwardly projecting elements on said first plate to grip a roadway in the form of swaged down longitudinally extending corrugations in the first plate, each extending between a swaged down peripheral portion of one hole of one row to a swaged down peripheral portion of one hole of the other row in the first plate, said swaged down longitudinally extending corrugations of said first plate arranged so that every straight line extending transversely, perpendicularly to the direction of length of the first plate passes through at least one of the swaged down longitudinally extending corrugations.

3,973,652

CLOSED LOOP TYPE DISC BRAKE

Kazuaki Shimizu, Yokohama, and Shunichi Toshida, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 396,175, Sept. 11, 1973, abandoned. This application Jan. 29, 1975, Ser. No. 545,225

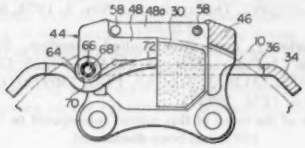
Claims priority, application Japan, Sept. 12, 1972, 47-106218[U]

Int. Cl.² F16D 65/02

U.S. Cl. 188—73.4 **3 Claims**

1. In a disc brake for wheeled vehicle, including a rotatable braking disc, a stationary hydraulic cylinder having inner and outer pistons slidable in opposite directions which are substantially parallel to the axis of said braking disc, said pistons defining a fluid chamber therebetween into which pressurized fluid is supplied when a braking action is initiated, directly and indirectly actuated friction pad assemblies adjacent to oppo-

site faces of said braking disc, said directly actuated friction pad assembly being in abutting engagement with said inner piston and thereby forced against said braking disc when said inner piston is moved by said pressurized fluid, and a yoke movable in a direction parallel to said axis of said braking disc by said outer piston to move said indirectly actuated friction pad assembly, the improvement in that said yoke has a pad



contacting edge which contacts the surface of the backing plate of said indirectly actuated friction pad assembly, said contacting edge being bent so that the edge thereof in contact with the surface of the backing plate of the pad is arc-shaped and contacting said backing plate along the entire length thereof so that said indirectly actuated friction pad assembly is reliably urged into a braking function.

3,973,653

DISC BRAKE

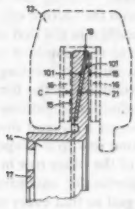
Otto Weber; Horst Hartwig, both of Wolfburg, and Günter Münchenberg, Fallersleben, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Feb. 12, 1973, Ser. No. 332,003

Claims priority, application Germany, Feb. 16, 1972, 2207162

Int. Cl.[2] F16D *65/12*; F16F *15/10*

U.S. Cl. 188—218 A **10 Claims**



1. In a disc brake, a friction disc having a pair of annular friction surfaces, brake shoes disposed about said friction surfaces for coming into frictional engagement with said friction surfaces when the brake is actuated, said friction disc comprising a cast member located in the region of said brake surfaces which come into frictional contact with said brake shoes when the brake shoes are actuated, said cast member comprising a separating joint means running oblique with respect to said friction surfaces.

3,973,654

VISCOSITY SENSITIVE VALVE FOR SHOCK ABSORBER

William George Patriquin, Port Credit, Canada, assignor to Gabriel of Canada Limited, London, Canada

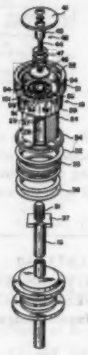
Filed Jan. 11, 1974, Ser. No. 432,782

Claims priority, application Canada, Mar. 15, 1973, 166203

Int. Cl.[2] F16F *9/34*

U.S. Cl. 188—282 **6 Claims**

1. In combination with a hydraulic shock absorber adapted to be connected between sprung and unsprung vehicle components, said absorber having a pressure tube, a piston slidable within said pressure tube dividing the interior of said tube into jounce and rebound pressure chambers, said piston having fluid passage means constrained for the controlled flow of fluid from one of said chambers to the other of said chambers, said fluid passage means having fixed cross-sectional area, the improvement being an annular groove means disposed about and cooperating with an extremity of said passage means, a first transverse passage means for communicating said annular groove means and said passage means, a second transverse passage means for communicating said groove means and the other of said chambers, a valve element extending over said annular groove means and said first and second transverse



passage means, a spring urging the valve element into effective covering engagement over said first and second transverse passage means to constrict fluid flowing through said fluid passage means through said first and second transverse passage means, said valve element being urged to a valve open position by intense fluid pressure differential between said jounce and said rebound pressure chambers in which the valve open position fluid flows without significant restriction from said passage means to the other of said chambers through a space between said valve element and said passage means extremity while by-passing said first and second transverse passage means.

3,973,655

INERTIA BRAKING DEVICE FOR A ROAD TRAILER, WITH CANCELLATION OF THE BRAKING ACTION WHEN REVERSING

Maurice Mollard, Louhans, France, assignor to F.T.F., Louhans, France

Filed Mar. 7, 1974, Ser. No. 449,168

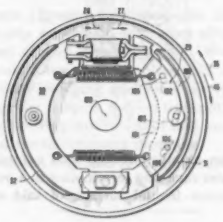
Claims priority, application France, Mar. 20, 1973, 73.11232

Int. Cl.[2] F16D *51/22*

U.S. Cl. 188—328 **1 Claim**

1. A braking device for trailers comprising a brake shoe supporting plate adapted to be fixedly mounted with respect to a trailer, a first one-piece brake shoe, a second two-part brake shoe, means for pivotally mounting one end of each of said brake shoes on said plate, actuator means disposed between the opposite ends of said brake shoes for moving said opposite ends of said brake shoes away from each other about said pivot means into engagement with a drum, said first brake shoe having a friction lining integral therewith, said two-part brake shoe comprising a first part pivoted on said pivot means and a second part having a friction lining integral therewith being movable relative to said first part, and lost-motion connecting means between said first and second parts, said lost-motion connecting means comprising elongated slot means

disposed in one of said parts and pin means connected to the other of said parts and extending through said elongated slot means, said elongated slot means being disposed at an acute angle relative to a line which is tangent to a curve parallel to the circumference of the lining of the two-part brake shoe with the end of said slot means closest to said pivot means being disposed radially inwardly with respect to the opposite ends of said slot means whereby engagement of the said two-part brake shoe with a forwardly rotating drum will cam said



second part of said two-part brake shoe radially outwardly relative to said first part into firm engagement with the drum while said one-piece shoe is brought into self-engagement with the drum and engagement of said two-part brake shoe with a brake drum rotating in the reverse direction will cam said second part of said two-part brake shoe radially inwardly relative to said first part while said one-piece shoe is overridden by the drum to render said shoes ineffective to brake the trailer.

3,973,656

SUSPENDED FIXTURE ASSEMBLY

David J. Zumbro, Eugene, Oreg., assignor to Merco Products, Inc., Eugene, Oreg.

Filed Dec. 20, 1974, Ser. No. 534,670
Int. Cl.² H02G *11/02*
U.S. Cl. 191—12 R **5 Claims**

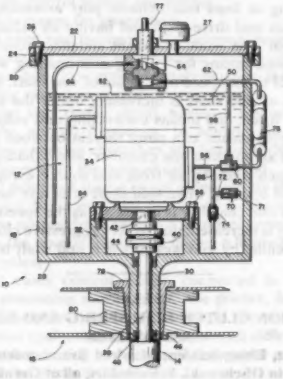
1. A suspended electrical fixture assembly comprising,
a bracket adapted for mounting on a fixed support,
a spring-powered drum assembly mounted on said support including a drum and a motor spring urging rotation of the drum,
a spool and means mounting the spool on said bracket adjacent said drum assembly with the spool's position relative to the drum assembly being fixed and with the spool anchored from free rotation relative to the bracket,
an elongate line secured to said drum and taken up thereon with rotation of the drum by the motor spring,
a fixture adapted to be suspended below said bracket,
said line extending downwardly from said drum to an expanse which is wrapped in at least one wrap about the spool which wrap through encircling the spool forms a bight in frictional engagement with the spool, and the line thence extending downwardly from said spool to a point of attachment with said fixture, and
a coiled conductor cord surround said line extending from adjacent the bracket to said fixture for supplying current to the fixture,
said line with the fixture suspended serving to support a major portion of the weight of the fixture, part of which is transmitted to said bracket through said spool and part of which is transmitted to said bracket through said drum assembly, said line with the fixture suspended, and where it forms said bight, frictionally engaging said spool by reason of said spring powered drum assembly tending to take up the line against the force of gravity produced by the weight of the fixture which pulls down on the line where such extends downwardly from the fixture causing the bight to tighten on said spool, such frictional engagement with the spool being released with manual lifting of the fixture which has the effect of tending to remove the weight of the spool as a factor producing such tightening.

3,973,657

VARIABLE SPEED FAN FOR HEAT EXCHANGERS

Raymond A. Darling, Tulsa, Okla., assignor to The Mott Company, Houston, Tex., a part interest

Filed Aug. 5, 1974, Ser. No. 494,568
Int. Cl.² F16D *31/00*
U.S. Cl. 192—58 R **13 Claims**



1. A variable speed fan for an air cooled heat exchanger having a constant speed drive shaft and comprising a variable speed torque coupling interposed between the drive shaft and the fan, said torque coupling comprising housing means freely journalled on the drive shaft for independent rotation therebetween and operably connected with the fan for rotation simultaneously therewith, a fluid reservoir provided in the housing means, a pump rigidly secured to the housing for movement simultaneously therewith and in communication with the fluid reservoir for recirculating the fluid therein, means operably connecting the pump with the drive shaft for actuation of the pump, variable orifice valve means in communication with the pump for receiving the fluid therethrough during recirculation of the fluid, said variable orifice valve being selectively operable between fully open and fully closed for controlling the

recirculation of the fluid whereby speed of rotation of the pump and housing means and fan may be selectively varied between a minimum rotational speed of zero and a maximum rotational speed equal to the speed of the drive shaft.

3,973,658

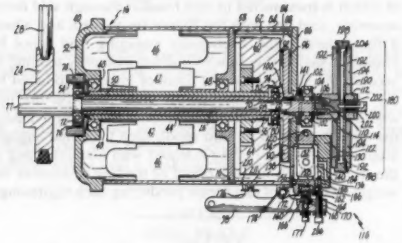
CLUTCH CONTROL MEANS FOR A PNEUMATIC NEEDLE POSITIONER

William Louis Breck, Jr., and Jack L. Pickle, both of El Paso, Tex., assignors to Farah Manufacturing Company, Inc., El Paso, Tex.

Division of Ser. No. 264,131, June 19, 1972, Pat. No. 3,805,930. This application Dec. 12, 1973, Ser. No. 424,071

Int. Cl.[2] F16D *43/284*

U.S. Cl. 192—86 **1 Claim**



1. In a machine having a rotary device shaft and a pneumatically operated clutch system including air supply means, a plurality of pressure chambers connected directly to said air supply means to receive air for controlling the clutch, means for varying the air pressure in one of said chambers comprising means mounted on said drive shaft for rotation therewith and defining at least one exhaust port extending generally radially from said drive shaft and having an exhaust opening remote from said shaft, a weight slidably mounted on the last-mentioned means for closing said opening with a force proportional to the speed of rotation of said shaft, as the speed of rotation of said shaft is increased, under the influence of centrifugal force, and means connecting said exhaust port to said air supply means at a point therein between a source of pressurized air and said one chamber, said exhaust port being normally open whereby air from said source escapes through said exhaust opening when said shaft is at rest, and the pressure in said one chamber is increased as the speed of rotation of said shaft is increased, due to the progressive closure of said exhaust opening by said weight when said shaft is rotated.

3,973,659

FRICTION CLUTCH DISK SPRING AND BEARING ASSEMBLIES

Horst Ernst, Eltingshausen; Manfred Brandenstein, Aschfeld, and Armin Olschewski, Schweinfurt, all of Germany, assignors to SKF Industrial Trading and Development Company, B.V., Amsterdam, Netherlands

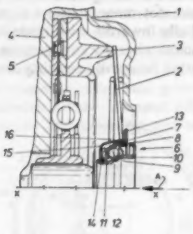
Filed May 31, 1974, Ser. No. 475,192

Claims priority, application Germany, June 1, 1973, 2327937

Int. Cl.[2] F16D *23/14*

U.S. Cl. 192—89 B **10 Claims**

1. An assembly of a clutch release bearing and a friction clutch having an annular spring release member formed with a central bore, said clutch release bearing comprising an inner ring, an outer race ring and a plurality of rolling bodies located therebetween, said outer race ring having an axial portion extending through said central bore into said spring release member, said outer race ring being integrally formed at its exterior end with a radially outwardly extending flange forming an annular shoulder engaging the exterior surface of said spring release member, and a shaped retaining ring adapted to be secured along its inner periphery to said outer race ring within the interior of said spring release member, said retaining ring having an axially directed wall extending over the surface of said outer race ring terminating in a peripheral edge engaging the interior frontal surface of said spring release member.



3,973,660

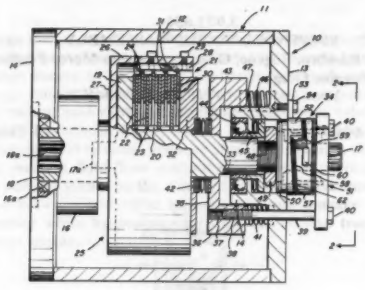
TRANSMISSION DEVICE AND CAM ACTUATOR THEREFORE

Donald L. Leopold, and Clifford C. Moulton, Sr., both of Minneapolis, Minn., assignors to Capsule Clutch Inc., Minneapolis, Minn.

Filed Dec. 11, 1974, Ser. No. 531,791

Int. Cl.[2] F16D *23/00*

U.S. Cl. 192—93 A **8 Claims**



1. A transmission device comprising a housing,

a revolvable input shaft projecting into said housing and being revolvable relative thereto and being adapted to be connected to a source of power;

a revolvable output shaft projecting into said housing for rotation relative thereto;

a clutch assembly disposed between said input and output shafts and being operable upon shifting movement to transmit or interrupt drive with respect to the output shaft, said clutch assembly including a generally cylindrically shaped driven member connected with said output shaft for rotation therewith, clutch driver elements positioned interiorly of said driven member and engaging said input shaft for rotation therewith and being axially shiftable relative thereto, clutch driven elements engaging the interior of the cylindrical driven member for rotation therewith and for axial movement relative thereto,

a pressure plate axially shiftable on said input shaft for urging the clutch driver elements into drive transmitting relation with the driven clutch elements,

a clutch actuator assembly, mounted adjacent said input shaft and including a stationary cam, a revolvable cam

adjacent said stationary cam, said cams being positioned exteriorly of said housing and confronting, generally helical camming surfaces, said revolvable cam when rotated being axially shiftable relative to said input shaft,

a non-rotatable force transmitting plate positioned in said housing adjacent said pressure plate and being axially shiftable with respect to said input shaft towards and away from said pressure plate upon revolving movement of said revolvable cam and to shift said clutch assembly into and out of driving relation with respect to said output shaft,

a shifter plate engaging said revolvable cam and being axially shiftable relative to said input shaft upon revolving movement of said revolvable cam, means directly connecting said force applying plate with said shifter plate,

resilient means engaging said force applying plate to normally urge the latter in a drive transmitting direction and yieldably resisting movement of said force applying member in a drive interrupting direction,

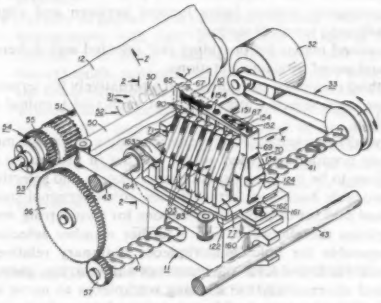
means connected with said revolvable cam for revolving the same.

3,973,661

WIRE-MATRIX PRINTERS, AND ELECTROMAGNETIC ACTUATOR MECHANISMS USEFUL IN SUCH PRINTERS

Jerome L. De Boo, Barrington; Edmund C. Feldy, Evanston, and Horace Stanley Grear, Mount Prospect, all of Ill., assignors to Teletype Corporation, Skokie, Ill.

Filed May 8, 1974, Ser. No. 468,046
Int. Cl.² B41J *3/12*
U.S. Cl. 197—1 R **128 Claims**



1. In a wire-matrix printer of the type including at least three reciprocable print wires, means for mounting inner printing ends of the wires, in a vertical column for movement toward and away from a printing station, and a plurality of individual actuators having portions connected to the outer ends of the print wires for reciprocating them to print characters, the improvement characterized by:

the print wires comprising substantially straight wires of uniformly varying length; and

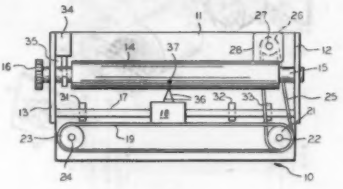
means for mounting the print wires essentially horizontally and parallel to each other in a vertical column throughout their lengths, for substantially linear reciprocation along spaced, parallel, essentially horizontal printing axes, and so that the lowermost wire in the column is the shortest and each successive higher wire in the column is a predetermined amount longer than the preceding one, whereby the outer ends of the print wires define a horizontally spaced and vertically stepped array.

3,973,662

ACCELERATION CONTROL SYSTEM FOR HIGH SPEED PRINTER

John R. Fulton, Brookfield, Ill., assignor to Extel Corporation, Northbrook, Ill.

Continuation of Ser. No. 528,447, Nov. 29, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,586
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **24 Claims**



1. An electronic print rate control system for a high speed column-sequential dot matrix printer utilizing a permutation code data input signal comprising a sequence of code words which, in continuous operation, occur at a given maximum receiving rate, the printer comprising: a print head and a print head drive for moving the print head through a sequence of a given number of column steps, in each print cycle, at a speed controlled by a print rate timing signal which also controls other printer functions; an operational storage register including a plurality of stages each capable of storing a code word; input means for recording each received code word in the storage register; and output means for reading code words from the register in the same sequence as recorded therein; the print rate control system comprising:

print clock means for generating:

a normal print rate timing signal of given normal frequency to actuate the printer to reproduce spacing characters at a normal print rate approximately equal to the maximum receiving rate,

a fast print rate timing signal, having a frequency higher than the normal frequency, to actuate the printer to reproduce spacing characters at a fast print rate, substantially faster than the normal print rate, and

a variable print rate timing signal progressively increasing in frequency from an initial frequency substantially lower than the normal frequency to a final frequency at least as high as the normal frequency, during a limited number of print cycles;

and print clock control means, connected to the timing signal generating means and to the printer, for applying one of the print rate timing signals to the printer during each print cycle, each in accordance with different predetermined operating conditions of the printer at the beginning of the print cycle,

the print clock control means applying the variable print rate timing signal to the printer for print cycles in which a spacing character is reproduced following an interval in which the print head has been at rest.

3,973,663

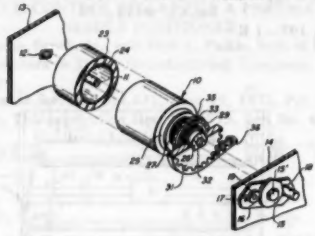
TYPEWRITER POWER ROLL CONSTRUCTION AND MOUNTING

Theodore N. Madison, Windsor, Conn., assignor to Litton Business Systems, Inc., New York, N.Y.

Division of Ser. No. 333,389, Feb. 16, 1973, Pat. No. 3,876,054. This application Dec. 13, 1974, Ser. No. 532,711
Int. Cl.² B41J *23/02*
U.S. Cl. 197—16 **3 Claims**

1. In a typewriter having side frames

a power roll comprising a cylindrical sleeve,
bearing means pressed into the ends of said sleeve,
a shaft for rotatably supporting said bearing means extending through openings in said side frames,
and means for non-rotatably securing the ends of said shaft relative to said side frames,



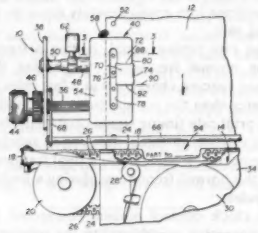
one of said bearing means including
a drive pulley constituting a part of a motor driven speed reducing power train for continuously rotating said power roll,
wherein said means for securing the ends of said shaft relative to said side frames include means associated therewith to permit individual adjustment of said shaft ends relative to said frames.

3,973,664

METHOD AND APPARATUS FOR POSITIONING A WEB IN A PRINTER

Robert R. Wanat, Park Ridge, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Mar. 27, 1975, Ser. No. 562,539
Int. Cl.² B41J 29/42, 15/00
U.S. Cl. 197—187 7 Claims



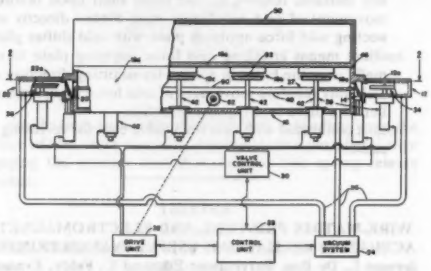
2. In combination with a high speed printer having facilities for selectively moving and positioning a web with respect to a type mechanism printing on the web along a print line, an apparatus for accurately locating a selected line of the web with respect to the type mechanism comprising:
means for defining a reference indicator spaced from the print line of the printer a preselected distance;
means for defining spaced first and second reference locations, the relative spacing of said first and second reference locations being substantially equivalent to the spacing between said reference indicator and the print line of the printer; said first and second reference location defining means being selectively movable with respect to said web along a line normal to the print line of the type mechanism thereby facilitating selective alignment of said first reference location with a preselected mark upon said web so that the successive alignment of said preselected mark upon the web with respect to said second reference location will cause that portion of the web aligned with said reference indicator to move into alignment with the type mechanism.

3,973,665

ARTICLE DELIVERY AND TRANSPORT APPARATUS FOR EVACUATED PROCESSING EQUIPMENT

Rosario P. Giammanco, Gloucester, Mass., assignor to GCA Corporation, Bedford, Mass.

Filed Mar. 7, 1975, Ser. No. 556,207
Int. Cl.² B23Q 17/18
U.S. Cl. 198—19 9 Claims



1. In apparatus for processing workpieces in a selected vacuum atmosphere, the improvement comprising
A. first means forming an aligned arrangement of a set of at least two stations for said processing of workpieces and at least two terminal stations for the transferral of workpieces to and/or from said set of processing stations, said processing stations being located between and aligned with said terminal stations,
B. second means for providing said selected atmosphere at said set of processing stations,
C. third means for providing, and alternatively for terminating, said selected atmosphere at each said terminal station,
D. workpiece transporting means including a carriage member normally disposed within said set of processing stations to be outside of said terminal station and selectively movable back and forth between either terminal station and said set of processing stations for transferring workpieces therebetween, and a further member selectively operable for holding workpieces stationary relative to said back-and-forth movement of said carriage member and alternatively for allowing workpieces to move with such movement of said carriage member, and
E. sequence control means connected with said transport means and with said third means, said control means operating said third means to provide said selected atmosphere at each terminal station during the disposition of said carriage transport member thereat, and operating said third means to terminate said selected atmosphere at each terminal station at selected times during the disposition of said carriage member outside that terminal station.

3,973,666

WARE ORIENTATION OR TRANSFER APPARATUS

Donald F. Hardy, Horseheads, N.Y., assignor to Dart Industries Inc., Los Angeles, Calif.

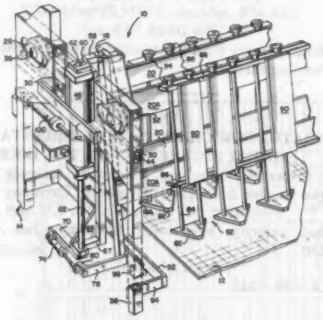
Continuation-in-part of Ser. No. 374,298, June 28, 1973, Pat. No. 3,886,891. This application Apr. 9, 1975, Ser. No. 566,482
Int. Cl.² B65G 47/26
U.S. Cl. 198—24 4 Claims

1. An orientation mechanism adapted to accurately align a plurality of moving and upstanding articles simultaneously and including:

a frame having portions above and transverse of a conveyor, a support structure mounted on said frame, said structure having at least one cross piece extending laterally of said conveyor approximately perpendicular to the direction of movement of such conveyor;

first actuating means connected to said frame and adapted to reciprocate said support structure longitudinally in the direction of and counter to the direction of movement of said conveyor;

second actuating means mounted on said support structure in engagement with the cross piece, said engagement therewith being such that the activation of said second means moves said cross piece approximately vertically to



a retracted position above and adjacent said upstanding articles;

a plurality of pusher units positioned on said cross piece for engagement with said articles and including bearing mounts with freely slidable positioned rods extending therethrough, separate pusher plates fixedly attached to the lower extremities of at least two each of said rods; and wherein said units are arranged in a plurality of parallel rows so that each cyclical movement of the mechanism will orient a plurality of rows of upstanding articles on the conveyor, and the said units in at least one of said parallel rows is pivotally mounted with respect to said support structure.

3,973,667

APPARATUS FOR VERTICALLY TRANSPORTING EGGS OR LIKE ARTICLES

Auke Jellema, and Jelle van der Schoot, both of Aalten, Netherlands, assignors to Staalkat B.V., Aalten, Netherlands

Filed June 10, 1974, Ser. No. 478,069

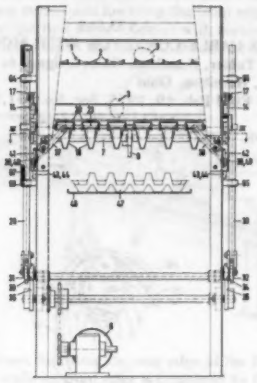
Int. Cl.² B65G *47/00*

U.S. Cl. 198—26 **3 Claims**

1. An apparatus for vertically transporting eggs or like articles, comprising:

a plurality of horizontally aligned basket means, each basket means consisting of first and second separate and spaced basket half members, all of the first basket half members being rotatable about a first horizontal shaft in a lower position and all of the second half members being similarly rotatable about a second horizontal shaft parallel to and horizontally spaced from the first shaft, for dispensing the egg or like article into a carton, all of either the first or second basket half members being formed by resilient tongue means resiliently receiving and holding the egg for movement between an upper position and the lower position and for permitting the eggs to be substantially completely inserted into the carton prior to releasing the eggs; and

means for simultaneously vertically moving said plurality of basket means between said upper position wherein each basket is capable of receiving an egg or like article from a distribution source and said lower position wherein each basket is disposed above the carton or the like being filled and for simultaneously rotating all of said first and



second basket half members about said first and second shafts so as to release said eggs or like articles in each said basket means into said carton.

3,973,668

CONVEYOR FOR ARTICLES OF DIFFERENT SIZES

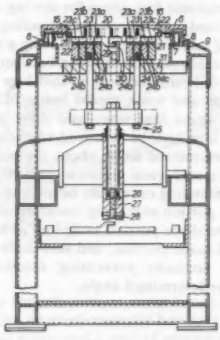
Stephen Raymond Stansfield, London, England, assignor to J. Lyons & Company Limited, London, England

Filed Oct. 31, 1974, Ser. No. 519,406

Claims priority, application United Kingdom, Nov. 5, 1973, 51331/73

Int. Cl.² B65G *37/00*

U.S. Cl. 198—106 **12 Claims**



1. A conveyor comprising a movable conveying surface, a plurality of article locating means for movement with the conveying surface, each movable relative to the conveying surface between an operative article locating position projecting from the surface and a retracted inoperative position, the intervals between said article locating means in both the operative positions and the inoperative positions as measured along the length of the conveyor movement axis being fixed in the normal course of apparatus use, and means for moving the article locating means between their operative and inoperative positions, and including a plurality of independently operable moving means, each arranged to move a different group of article locating means, each group comprising a plurality of article locating means, such that the conveyor can be used for

conveying differently sized articles at different times by operating a different one of the moving means.

3,973,669

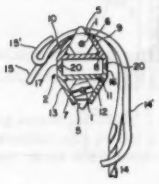
ENDLESS CABLE CONVEYOR WITH MOLDED LUGS

Charles P. Tabler, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio

Filed Feb. 19, 1975, Ser. No. 551,140

Int. Cl.² B65G *17/12*

U.S. Cl. 198—130 **21 Claims**



1. A conveyor, comprising: an endless conveyor member including an endless cable and a plurality of individual, separate lugs spaced along the length of said cable; track means for guiding said conveyor member in a predetermined conveyor path; drive means for moving said conveyor member in said predetermined path; said track means including outer opposite side walls extending inwardly towards each other with free edges generally parallel and spaced from each other; said track means receiving therein the adjacent ones of said lugs with said lugs each having a first drive portion extending outwardly beyond said free edges for driving adjacent articles to be conveyed and a guide portion extending inwardly on the opposite side of said free edges and having a transverse width substantially greater than the spacing between said free edges for preventing outward removal of said lugs from said track means; said lugs and track means being of such transverse cross sectional shape that when said drive portion becomes damaged, said lugs may be removed from said track means, rotated a predetermined angle about the axis of said cable, and reinserted in said track means to present a second article drive portion extending outwardly beyond said free edges and a second guide portion extending inwardly of said free edges, with said second drive portion including at least some of the first mentioned guide portion; and said track means and lugs having means normally preventing rotation of said lugs through said predetermined angle.

3,973,670

CONVEYOR BELT

Hermann Spaar, Cologne, Germany, assignor to Clouth Gummiwerke AG, Cologne, Germany

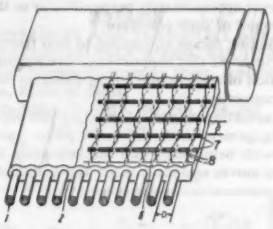
Filed May 23, 1975, Ser. No. 580,326

Claims priority, application Germany, May 27, 1974, 2425465

Int. Cl.² B65G *15/30*

U.S. Cl. 198—193 **10 Claims**

1. A conveyor belt comprising a flat body of flexible material; a multiplicity of longitudinally extending reinforcing strands embedded in said body and lying in at least one plane therein; and a longitudinal-tear barrier embedded in said body at least above said strands, said barrier comprising a fabric layer having interwoven threads running in the longitudinal direction of the belt and transversely thereof, the tensile strength of the transversely running threads being at least



eight times greater than the tensile strength of the longitudinally running threads.

3,973,671

APPARATUS FOR CHANGING THE ORIENTATION OF FILTER CIGARETTES OR THE LIKE

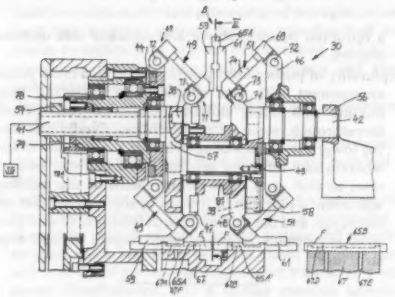
Dieter Schwenke, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Dec. 30, 1974, Ser. No. 537,669

Claims priority, application Germany, Jan. 30, 1974, 2404230

Int. Cl.² B65G *47/24*

U.S. Cl. 198—248 **19 Claims**



1. A turn-around device for cigarettes or analogous rod-shaped articles, comprising first conveyor means having a plurality of first receiving means for articles to be turned, a plurality of second receiving means for turned articles, and means for moving said receiving means sideways along parallel first and second paths and past a first transfer station; second conveyor means having annuli of first and second links respectively adjacent to said first and second paths, first and second suction heads respectively mounted on said first and second links, first and second rotary supports, means for articulately connecting said supports with said first links, means for rotating said supports about parallel axes to move said first links along a first endless path having a first portion which is adjacent to said first station and in which successive first suction heads remove articles from successive first receiving means and a second portion which is adjacent to a second transfer station and in which successive first suction heads maintain the articles substantially at right angles to said receiving means, third and fourth rotary supports, means for articulately connecting said third and fourth supports with said second links, and means for rotating said third and fourth supports about parallel axes to move said second links along a second endless path having a first portion which is adjacent to said second station and in which successive second suction heads accept articles from successive first suction heads and

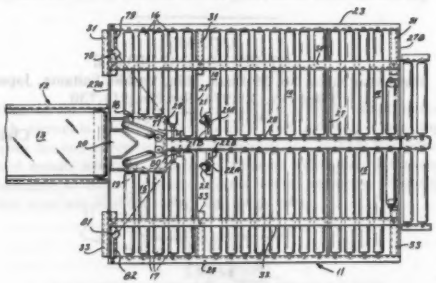
a second portion which is adjacent to said first station and in which successive second suction heads deliver turned articles into successive second receiving means; coaxial first and second shafts for said first and fourth supports; a third shaft for said second and third supports; first and second holders respectively connecting said first and third and said second and third shafts; and a suction generating device, said first and second shafts and said holders defining passages connecting said suction heads with said suction generating device in predetermined angular positions of said supports.

3,973,672

ARTICLE CONVEYING AND ORIENTING APPARATUS

Lawrence Frost, Cahokia, Ill., assignor to Alvey Inc., St. Louis, Mo.

Filed May 28, 1975, Ser. No. 574,612
Int. Cl.² B65G 47/14
U.S. Cl. 198—283 5 Claims



1. In article conveying and orienting apparatus for articles moved from a common feed path selectively into either of a pair of separate paths, the improvement comprising: a feed conveyor defining a plane of article movement and operative to move articles in spaced apart relation along a path ending at a discharge end; a pair of article receiving roller conveyors defining planes of article movement and having article receiving ends adjacent each other and adjacent said feed conveyor discharge end, said pair of article receiving roller conveyors being on opposite sides of an axis substantially centered with said feed conveyor path; an article steering wheel located in the article receiving end of each of said article receiving roller conveyors, each steering wheel being oppositely angularly oriented and movable to have the periphery thereof project above the plane of article movement from said feed conveyor to an article receiving roller conveyor to engage and direct articles toward the opposite one of said article receiving roller conveyors and initiating a turning response in the articles; means operably mounting said steering wheels such that the periphery of only one at a time is above the plane of said paths of article conveyance for the purpose of engaging and directing the articles onto an article receiving roller conveyor; and means beyond each of said steering wheels in the direction of article movement and operably disposed in said pair of article receiving roller conveyors to be engaged by articles directed into said article receiving roller conveyors and continue a change in the turning response of such articles to change the orientation from that on said feed conveyor.

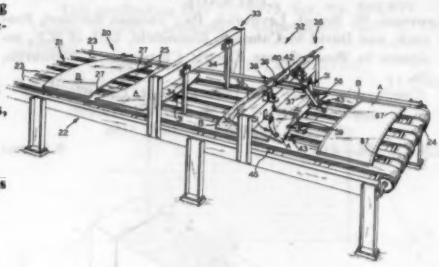
3,973,673

METHOD AND APPARATUS FOR TURNING OVER SHEETS

Surendra S. Ahluwalia, Collingwood, Canada, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Feb. 6, 1975, Ser. No. 547,825
Int. Cl.² B65G 47/24
U.S. Cl. 198—285 14 Claims

6. In a sheet turnover apparatus of the type having a conveyor for moving pairs of substantially rigid sheets along a defined path, sheet lifting means for engaging the front edge of the first sheet of a pair of sheets to lift it upwardly about its rear edge as the rear edge continues to move with the conveyor, means for receiving the front edge of the first sheet from the lifting means and lowering the front edge of the first sheet to invert the first sheet together with means for depositing the first sheet upon the second sheet, the improvement



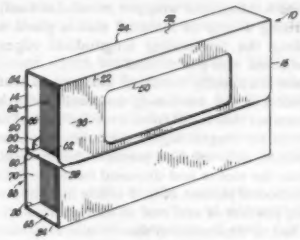
comprising means for lifting the rear edge of the first sheet off the conveyor while its front edge is contained by the receiving and lowering means for arresting its turnover cycle, and means for lowering the rear edge of the first sheet onto the conveyor when the second sheet of said pair of sheets is moved into a predetermined location beneath said first sheet whereby the first sheet is placed on a second sheet in an inverted and predetermined position.

3,973,674

SHIPPING AND STORAGE PACKAGE FOR PAPER SHEET ITEMS

Carl A. Postlethwaite, Shawnee Mission, Kans., assignor to Posty Cards, Incorporated, Kansas City, Mo.

Filed July 7, 1975, Ser. No. 593,706
Int. Cl.² B65D 65/00, 85/00, 1/34
U.S. Cl. 206—215 8 Claims



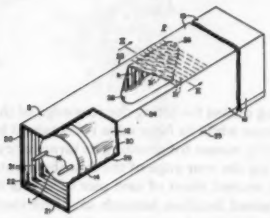
1. A package for paper items comprising:
an initially flat sheet of material having a pair of spaced, longitudinal edges and a pair of spaced end edges;
a series of transverse lines of fold extending across said sheet between said longitudinal edges to define a front panel, a top panel, a rear wall, a front wall, a bottom panel, and a rear panel;
a pocket for receiving said items formed when said sheet is folded along certain of said lines of fold, said pocket being defined by said front wall, bottom panel and rear panel;
a cover for said items formed when said sheet is folded along certain other of said lines of fold, said cover being defined by said front panel, said top panel and said rear wall, said cover being engageable with said pocket whereby to retain said items in said package; and
a pair of opposed, spaced-apart strips extending between said rear panel and said front wall, said strips having inner

edges defining, with said rear panel and front wall, the open end of said pocket.

3,973,675
PROTECTIVE WRAPPER FOR FLUORESCENT LAMPS AND SIMILAR FRAGILE ARTICLES, AND RESULTING PACKAGE

Lawrence W. Brand, Levittown, Pa.; Thomas Barbieri, Peapack, and David McCalmont, Bloomfield, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 182,622, Sept. 22, 1971. This application Oct. 2, 1975, Ser. No. 619,106
Int. Cl.² B65D *85/70, 3/04, 5/56*
U.S. Cl. 206—418 9 Claims



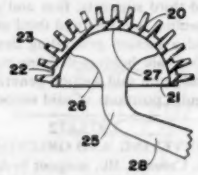
1. A package comprising the combination of;
an elongated fragile article having a portion which is substantially circular in cross-section and defines the maximum lateral dimension of said article,
a tubular open-ended sleeve of corrugated paper disposed in overlying protective relationship with said article and having a plurality of connected wall panels that are so shaped and arranged that at least two of said wall panels are contiguous with the said circular cross-sectioned portion of the article and are located on generally opposite sides thereof,
means holding said wrapper in tubular configuration comprising a strip of material that is glued to and extends along the terminating longitudinal edges of a pair of adjacent wall panels, and
means frictionally retaining said article within said open-ended sleeve consisting essentially of a hinged tab-like member that is cut from a medial part of and thus constitutes an integral segment of one of said contiguous wall panels, said tab-like member being displaced inwardly into the sleeve and disposed between the circular cross-sectioned portion of said article and the overlying adjoining portion of said one of said contiguous wall panels,
the lateral dimension of the circular cross-sectioned portion of said article and the spacing between said two contiguous wall panels being so correlated relative to the thickness of said hinged tab-like member that said tab-like member is tightly sandwiched between the article and said one of said contiguous wall panels and thereby frictionally locks the article in pressured engagement with said sleeve and securely anchors said article in place therein.

3,973,676
CLOTH OR TOWEL RACK

Claude H. Brooks, 1416 Crestview Drive, Shelby, N.C. 28150

Filed Mar. 24, 1975, Ser. No. 561,330
Int. Cl.² A47F *7/19*
U.S. Cl. 211—87 1 Claim

1. A rack or holder for keeping cloths, towels, or other flexible or cloth-like materials, between uses, including a cap substantially in the form of one half of a hollow sphere over which articles may be draped, means for supporting the cap with its hollow portion facing downwardly, said cap being made of flexible material and having a spherical outer upwardly facing surface embodying radially outwardly extending

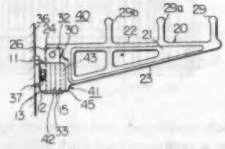


slender (easily flexed) conical spines for contacting and holding said articles, said spines being elongated sufficiently to permit the same to be easily flexed laterally in any direction.

3,973,677
CLOTHES DRYING DEVICE

Hiromitsu Naka, No. 39 Daza, Shin, Yashio, Saitama, Japan

Filed Oct. 3, 1974, Ser. No. 511,730
Int. Cl.² A47F *5/08*
U.S. Cl. 211—97 4 Claims



1. A cantilever-type drying device comprising:
an anchoring member adapted to be secured to a supportive structure, said anchoring member having a cylindrical main body portion with a vertical bore therethrough and at least one longitudinal groove in the outer longitudinal surface of said cylindrical main body;
an upright cylindrical support shaft fitted into and having a portion extending above said vertical bore and axially rotatable therein, said extended portion having a vertical cutout portion in the cetner thereof in the axial direction and two aligned bores, transverse to said vertical bore, one bore through each portion of said shaft on either side of said cutout portion; and
support arm means for supporting clothes rods and lines thereon pivotally connected inbetween said cutout portion of said extended portion of said vertical shaft, movable in the vertical direction, and engageable with said longitudinal groove in said main body portion, whereby said support arm means and said support shaft connected thereto are prevented from rotating in the horizontal direction when said support arm means engages said longitudinal groove.

3,973,678
DISPLAY BRACKETS

George G. Nesbitt, Denver, Colo., assignor to Denver Wood Products Co., Denver, Colo.

Filed Mar. 5, 1975, Ser. No. 555,467
Int. Cl.² A47F *5/08*
U.S. Cl. 211—106 4 Claims

1. A bracket assembly for mounting on an upstanding support to hold and display items of merchandise comprising fastener means for engagement with said upstanding support, a main trunk component extending forwardly of said support when installed, a plurality of arms disposed in echelon posi-

tions along the length of said main trunk and extending laterally therefrom whereby a plurality of merchandise items may be displayed in dispersed positions on opposite sides of said main trunk for convenient viewing and access, said laterally extending arms being of formed wire construction with portions of the lateral segments of said arms being offset, index tab elements pivotally disposed on said laterally extending arms for movement to alternate display and storage positions, and means whereby said index tabs are selectively interconnectable to offset portions of said lateral segments whereby the arms are reinforced by said index tabs.

3,973,679

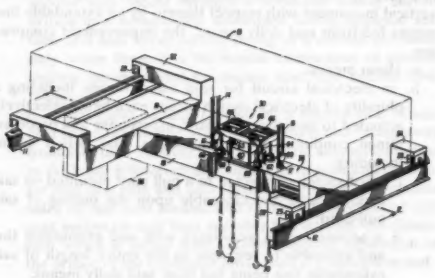
BRIDGE CRANE WITH LOAD CELLS FOR CORRELATING THE LIFT OPERATION

Winfield M. Hass; Howard E. Niehaus, and James L. Pack, all of Owensboro, Ky., assignors to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.

Filed Mar. 18, 1975, Ser. No. 559,484

Int. Cl.[2] B66C *17/00*

U.S. Cl. 212—18 **11 Claims**



1. Apparatus for lifting a load comprising a bridge crane mounted on a pair of overhead parallel rails, a lifting beam mounted on said rails in juxtaposed relation to said bridge crane, said bridge crane including lifting means operatively connected to said lifting beam for applying a lifting force thereto, said lifting beam including lifting means adapted to be connected to a load, and means for correlating the operation of the respective lifting means of said bridge crane and said lifting beam whereby a load may be apportioned therebetween.

3,973,680

DEVICES FOR ERECTING A BUILDING FROM PREFABRICATED SECTIONS

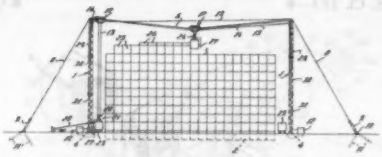
Cornelis van der Lely, 7, Bruschenrain, Zug, and Hendricus Jacobus Cornelis Nieuwenhoven, Hirssattelweg, 6340 Baar, both of Switzerland

Continuation of Ser. No. 413,373, Nov. 6, 1973, abandoned. This application May 27, 1975, Ser. No. 580,979

Claims priority, application Netherlands, Nov. 7, 1972, 7215004

Int. Cl.[2] E04G *23/06;* **B66C** *21/00*

U.S. Cl. 212—76 **11 Claims**



7. Apparatus for rapidly erecting a building from elongated prefabricated parallelepiped sections which comprises:

two vertically disposed masts;

a substantially horizontal guide means disposed between said masts and connected to the upper aspects thereof, said masts and said guide means being substantially within the same vertical plane at all times during operation thereof, said masts being located on opposite sides of the place selected for the foundation of the building to be erected and within said vertical plane in substantial parallel alignment with the horizontal longitudinal center line of the building to be erected;

at least one of said masts being located to define between it and the place selected for the foundation of the building to be erected a section discharge receiving space conforming to the size of the prefabricated sections for the building to be erected;

transport means adapted to position prefabricated sections for the building to be erected within said space in the directional orientation they will occupy in the completed building;

hoisting means which comprises a trolley carried by said guide means, elongated flexible extensible means depending from said trolley, and a yoke for supporting said sections connected to said flexible means;

moving means provided for said trolley whereby it is movable along said guide means to a position directly above said defined space;

said yoke provided with section orientation maintaining means for performing the function of substantially maintaining the directional orientation of each said section supported by the yoke;

said hoisting means, including said trolley and said yoke, adapted to carry each said section for the building to be erected from said defined space in a horizontal position and otherwise in an orientation maintained by said orientation maintaining means whereby at all times from when each said section is vertically elevated from said defined space until it is placed in the building being erected, its longitudinal axis is substantially horizontal and substantially perpendicular to said vertical plane and its shorter sides move substantially parallel to a longitudinal side of the building to be erected;

a remote control means provided for controlling the operation of said hoisting means and said trolley, said remote control means interconnected with and depending from said hoisting means relative to each said section carried thereby and being directly available to an operator who may be located on a component of the building to be erected proximate the correct place for said section therein so that such operator is enabled to control di-

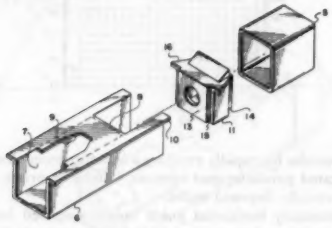
rectly by said remote means said hoisting means for efficiently and accurately positioning each said section in its correct place in the completed building.

3,973,681

TRANSITION CASTING FOR USE IN SILLS OF FREIGHT CARS

Albert Edward Martin, Lancaster, N.Y., and Stanley Herbert Fillion, Wilmette, Ill., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 27, 1975, Ser. No. 553,938
Int. Cl.² B61G 9/22
U.S. Cl. 213—8 **6 Claims**



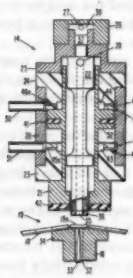
1. In a railway car having an underframe, the combination of at least one centrally located inverted U-shaped draft sill, disposed longitudinally at an end thereof; a fixed, elongated longitudinally extending tubular-like sill connected to the draft sill by a transition member which telescopes into and mates with surfaces of the tubular-like sill and the draft sill, the U-shaped sill having a pocket for receiving a center filler, the transition member having a vertical end wall which provides one side of the center filler pocket.

3,973,682

PICK UP ASSEMBLY FOR FRAGILE DEVICES

Dieter Klaus Neff, Cambridge, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,935
Int. Cl.² B65B 69/00
U.S. Cl. 214—1 BT **15 Claims**



1. In an apparatus for contacting a fragile device comprising,

means for supporting said fragile device in a predetermined position,

a contact element containing a pick up pencil and,

means for moving said contact element toward said device, said moving means including fluid means for providing a controlled deacceleration to said contact element to cause the motion of the element toward the device to be substantially zero as the element comes in contact with the device,

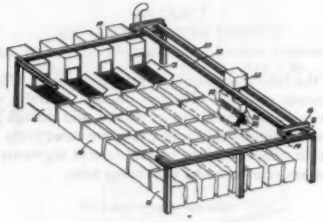
said fluid means including a chamber having an opening to exhaust the fluid out of the apparatus and reduce the pressure on said fluid to atmospheric pressure.

3,973,683

SAFETY MEANS FOR FIBER PICK-UP AND TRANSPORTING APPARATUS

Alex Jacques Keller, Gastonia, N.C., assignor to Automatic Material Handling, Inc., Gastonia, N.C.

Filed Apr. 17, 1975, Ser. No. 568,853
Int. Cl.² B66C 17/00
U.S. Cl. 214—1 BB **11 Claims**



1. In combination with apparatus for automatically picking up fibers from a plurality of bales and delivering said fibers to a collecting point, said apparatus including track means, crane means mounted on said tracks for movement therealong in response to receipt of an electrical signal, dolly means mounted on said crane for movement with respect thereto, and pick-up head means mounted on said dolly means for vertical movement with respect thereto by an extendable line means fed from said dolly means, the improvement comprising:

a. alarm means;

b. an electrical circuit for said alarm means including a plurality of electrical switch means each being selectively actuated to energize said alarm in response to a predetermined condition of said apparatus, said switch means including:

i. a first switch connected to a pull cord mounted on said pick-up head and closeable upon the pulling of said pull-cord;

ii. a second switch associated with said extendable line and closeable in response to the entire length of said extendable line being fed from said dolly means;

iii. a third switch associated with said pick-up head means and closeable in response to said pick-up head being moved a predetermined vertical distance beneath said dolly means;

iv. a fourth switch associated with said dolly means and closeable in response to said dolly means moving past a predetermined point on said crane means;

v. a fifth switch associated with said crane means and closeable in response to said crane means moving past a predetermined point on said track means; and

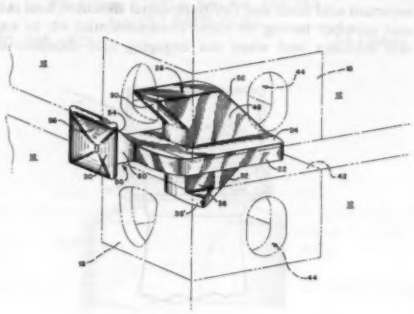
vi. a sixth switch associated with said crane means and closeable in response to said crane means assuming a predetermined canted relationship with respect to said track means.

3,973,684

VERTICAL LOCKING SYSTEM FOR SHIPPING CONTAINERS

John M. Di Martino, 72 Lumur Drive, Sayville, N.Y. 11782

Filed June 5, 1974, Ser. No. 476,381
Int. Cl.[2] B65G *1/14*
U.S. Cl. 214—10.5 R 9 Claims



1. A one piece passive vertical connector made of inflexible material for stackable containers, said containers of the type having an I.S.O. standard corner fitting at each of the corners thereof, said corner fitting having orifices in the outer surfaces thereof, said orifices opening into an inner recess in said fitting, said connector comprising:

means defining a planar base member;

foot means depending from said base member substantially within its periphery, said foot means having shoulder portions thereon for engaging the inner surface of the corner fitting, said foot means insertable through a first orifice in a horizontally disposed surface of a said corner fitting of a first container and twistingly engagable in a first said recess;

post means extending upwardly from said base member substantially within its periphery, a first side of said post means forming an acute angle with and facing said base member, said post means removably penetrable into a second said recess through a vertically facing second orifice in a horizontally downward facing disposed surface of a said lower corner fitting of a second container only when there is a horizontal component of relative motion between said connector and said second container;

and, a first ramp surface formed on a second side of said post means extending at an obtuse angle and facing away from said base member for guiding said second container as the latter is lowered into engagement with said connector said first side and said second side being on opposite sides of said post means, and that the projection of said post means on said base member has at least one dimension which is larger than a corresponding dimension of the orifice of the container into which it is being inserted.

3,973,685

PHOTOELECTRIC SENSING APPARATUS FOR PALLET STORAGE SYSTEMS

Weston R. Loomer, Walton, Ky., assignor to Litton Systems, Inc., Beverly Hills, Calif.

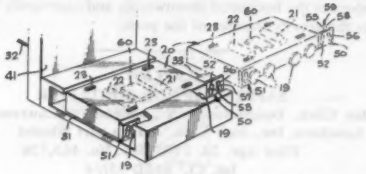
Continuation-in-part of Ser. No. 425,495, Dec. 17, 1973, abandoned. This application June 23, 1975, Ser. No. 589,141
Int. Cl.[2] B65E *1/06*
U.S. Cl. 214—16 B 5 Claims

1. In an automated storage system having a storage rack for receiving a quantity of loaded pallets with a reflecting surface thereon and a robot vehicle movable into and out of said storage rack for respectively retrieving and depositing loaded pallets from and onto said storage rack, said storage system comprising:

means on said robot vehicle for lifting a loaded pallet and propelling said robot vehicle;

logic means for controlling the operation of said propelling means;

first and second photoelectric means mounted on said robot vehicle, said first means operative in response to a loaded condition of the vehicle for sensing the proximity of a loaded pallet on the storage rack ahead of said vehicle, and said second photoelectric means operative in response to an unloaded condition of said vehicle for sensing when said vehicle has been positioned underneath a



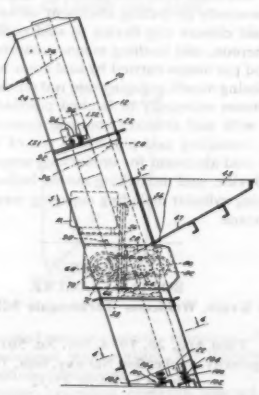
stored pallet on the rack, said sensing means including a transmitter for projecting a light beam along a first axis, and a receiver for receiving a reflected light beam along a second axis, said transmitter and receiver being angularly oriented relative to each other to enable the first and second axis to intersect at a junction located in the same horizontal plate as a preselected reflecting surface of said pallet, said photoelectric sensing means having means for generating an electrical signal when the moving robot vehicle causes the sensing means to pass under said preselected reflecting surface thereby enabling the preselected surface to reflect the projected light beam from the transmitter to the receiver, and means for feeding said signal to said logic means.

3,973,686

PLURAL CONTACTING ELEVATORS WITH INCLINED PLATFORMS

Charles F. Rivers, 15318 Warwick Road, Detroit, Mich. 48223

Filed July 10, 1974, Ser. No. 486,950
Int. Cl.[2] B65G *47/00*
U.S. Cl. 214—95 R 4 Claims



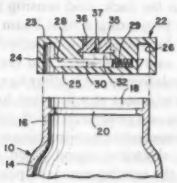
1. A parts loader comprising a frame, two elevators each having a parts-supporting shelf, means on said frame guiding the first elevator for up and down reciprocation, means on said frame guiding the second elevator for up and down recip-

rocation alongside and parallel to said first elevator, said first elevator having a front wall in sliding contact with the rear edge of the shelf of said second elevator, a rear wall mounted on said frame in sliding contact with the rear edge of the shelf of said first elevator, and reversible drive means for reciprocating said elevators simultaneously in opposite directions to substantially balance the load, said drive means being operable in one direction to move said first elevator up to a discharge point while moving said second elevator down to a loading point and operable in the opposite direction to move said first elevator down and said second elevator up to a point where said shelves are substantially contiguous and flush for the transfer of a load of parts from the shelf of the second elevator to that of the first, said shelves being inclined with respect to the horizontal downwardly and rearwardly to facilitate the gravity transfer of the parts.

3,973,687
SAFETY CAP FOR CONTAINER

Allan Glick, Douglaston, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 24, 1974, Ser. No. 463,726
Int. Cl.² B65D *55/14*
U.S. Cl. 215—207 **4 Claims**



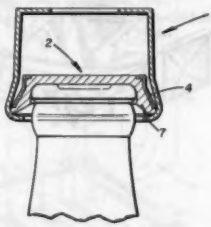
1. A safety closure cap device for use with containers formed with at least one inwardly projecting abutment carried on an inner surface of the container, said closure cap device comprising major cap body means, inner body hub means, top wall means engaging said body hub means, outer skirt wall means carried by and depending from said top wall means and spaced from said inner body hub means to form a downwardly open interspace recess therebetween for reception in said interspace recess of the discharge opening end portion of said container for fitting thereover, releasable latching means carried by said inner body hub means for latching engagement with said inwardly projecting abutment on said container for latching said closure cap device to said container in closed position thereon, said latching means comprising at least one latching rod pin means carried by said inner body hub means, resilient biasing means engaging said rod pin means for biasing said pin means outwardly to latched position in latched engagement with said abutment on said container, unlatching means for retracting said pin means out of latched engagement with said abutment for unblocking removal of said closure cap device, said unlatching means including a rotatable key receiving cylinder including engaging means for engaging said pin means.

3,973,688
BOTTLE CLOSURE

Ole Jacob Kvam, Waldemar Thranesgate 84B,, Oslo 1, Norway

Filed Aug. 28, 1974, Ser. No. 501,269
Claims priority, application Norway, Sept. 7, 1973, 3502/73
Int. Cl.² B65D *45/32*
U.S. Cl. 215—272 **4 Claims**

1. A closure for a bottle having a rim bead forming a downwardly directed outer circumferential shoulder, said closure comprising a sealing member of resilient material, an annular collar carried thereby and a rigid retaining cap within which said member and collar are slidably mounted, said cap having a circular cross-section with a side wall terminating at the top by a transverse top wall having a central aperture and having a downwardly extending flared skirt terminating in a rounded inwardly turned circumferential flange, said sealing member having a transverse top wall to seat removably across the top of said rim bead of said bottle and a downwardly extending continuous circumferential skirt integral with said top wall to surround said bead and circumferential shoulder, said skirt of said member having an inner circumferential rib to engage said shoulder and when not engaging said shoulder being

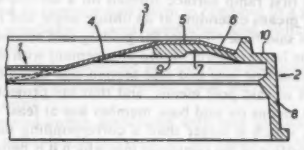


flared downwardly and outwardly to clear said rim bead to permit the sealing member to be mounted on the bottle and to be lifted away from said bottle without interference with said rim bead, said member carrying an annular collar extending over the edge of the top wall and over the downwardly extending skirt, said collar being in slidable contact with the interior surface of said cap, said sealing member and collar when not engaging said rim bead and circumferential shoulder being positioned within the flared skirt position of said cap and when engaging said rim bead and circumferential shoulder being positioned within said cap in contact with said transverse wall of said cap.

3,973,689
CONTAINERS

Brian Leo Chudleigh Sutch, Thames Ditton, England, assignor to Airfix Industries Limited, London, England

Filed June 21, 1974, Ser. No. 481,878
Claims priority, application United Kingdom, June 22, 1973, 29855/73
Int. Cl.² B65D *41/18*
U.S. Cl. 215—317 **5 Claims**



1. A composite lid or the like comprising a panel of flexible sheet material in generally planar form but deformed at its margin to define there a peripherally extending channel having inner and outer legs interconnected by an intermediate part, and a molding of synthetic plastics material bonded to the margin by formation thereon and extending about that margin, the molding including an inner part which extends into the channel and is bonded to the bottom surface of the inner and outer legs and the intermediate part of the channel, said molding having an outer part which extends from the inner part thereof which is in the channel of the blank in the direction in which the channel opens, the panel inwardly of the channel being bowed in the direction in which the channel

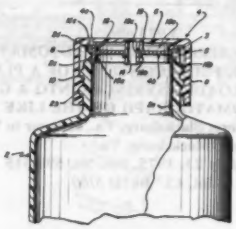
opens by displacement of the inner part due to shrinkage of the molding.

3,973,690

SEALING CLOSURE CAP ASSEMBLY

Barry L. Schneider, Crystal Lake, Ill., assignor to Chemtrust Industries Corporation, Franklin Park, Ill.

Filed June 3, 1974, Ser. No. 475,383
Int. Cl.² B65D *41/04*
U.S. Cl. 215—329 14 Claims



1. A sealing closure assembly for a container having a discharge mouth with external screw thread means surrounding said mouth; said sealing closure assembly comprising: closure cap means having an end wall from the perimeter portion of which extends a cylindrical side wall with internal threads for releasably interlocking with said container external screw thread means, rotation of the closure cap means in one direction or the other relative thereto respectively effecting axis inward or outward movement thereof relative to the container mouth, and a sealing member supported on the inside of the end wall of the closure cap means so the closure cap means is axially and rotatably movable with respect to the sealing member, the sealing member having a sealing portion which sealing portion engages the mouth of said container and makes a releasable locking fit therewith when said cap means is threaded onto the container, said closure cap means having sealing member engaging means engaging said sealing member so said closure cap means is permanently and continuously mounted with respect thereto when the sealing member is in locking engagement with the container mouth; said sealing member engaging means having radially projecting means forming axially outwardly facing shoulder means slidably engageable with a pre-formed permanently inwardly facing portion of said sealing member so unthreading said closure cap means ultimately slidably engages and exerts an outward, releasing force on said releasably locked sealing member, said sealing member releasably interlocking with said container mouth with a force so it remains in place in sealing relation to the closure mouth when said closure cap means is intially unthreaded from the container but is forced loose from sealing and locking engagement with said container mouth by the said shoulder means of the closure cap means solely by the force created by the further unthreading of the closure cap means from said external screw thread means of the container.

3,973,691

FLUORESCENT LAMP HAVING IMPROVED PHOSPHOR COATING

Eric L. Mager, Beverly, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Oct. 21, 1974, Ser. No. 516,720
Int. Cl.² H01J *61/44*
U.S. Cl. 220—2.1 R 2 Claims

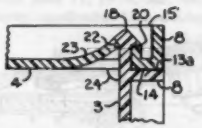
1. A fluorescent lamp having a phosphor coating on the inner surface of the lamp envelope, said coating containing a small amount of barium carbonate, the quantity of barium carbonate in the coating being less than about 1% of the weight of the phosphor, for more initial light output and better maintenance of light output.

3,973,692

INJECTION MOLDED FOLDING BOX

Harold S. Cloyd, Erie, Pa., assignor to Nosco Plastics, Inc., Erie, Pa.

Continuation-in-part of Ser. No. 390,920, Aug. 23, 1973, Pat. No. 3,858,745. This application Dec. 24, 1974, Ser. No. 536,085
The portion of the term of this patent subsequent to Jan. 7, 1992, has been disclaimed.
Int. Cl.² B65D *7/24*
U.S. Cl. 220—7 10 Claims



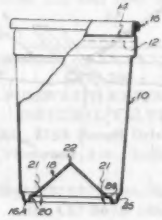
1. A box comprising first and second panels transverse to each other, the first panel having an edge transverse to and abutting a surface of the second panel, said first panel edge having a projection with a head extending through to the opposite surface of the second panel, said second panel having a slot receiving the projection and a tab with a free end at one side of the slot and with the opposite end of the tab joined to said second panel and the sides of the tab free to deflect relative to said second panel, said head extending through said slot and deflecting said tab, a shoulder on one side of the head engaging said first end of the tab with the tab in the deflected position, and a stop means on the opposite surface of said second panel engaging the opposite side of the head.

3,973,693

CONTAINERS FOR CONTAINING CARBONATED BEVERAGES

Jack Brocklehurst, Leeds, England, assignor to Plastona (John Waddington) Limited, England

Filed Mar. 5, 1975, Ser. No. 555,554
Claims priority, application United Kingdom, Mar. 12, 1974, 10923/74; Apr. 19, 1974, 17348/74
Int. Cl.² B65D *1/40*, *21/08*
U.S. Cl. 220—66 3 Claims



1. In a thin-walled nestable plastic container of the type having a frusto-conical wall portion, the improvement of an expansible bottom comprising

a conical portion extending centrally upward into the frusto-conical portion of the container,

a radial shoulder ring section connected to the bottom of the conical section and extending radially outwardly therefrom,

an axial ring section attached to the radial shoulder ring section at its outer periphery and extending downwardly therefrom,

a radial base ring section attached to the lower end of the axial ring section and extending outwardly therefrom, and

means connecting the radial base ring section to the lower end of the frusto-conical wall portion.

3,973,694

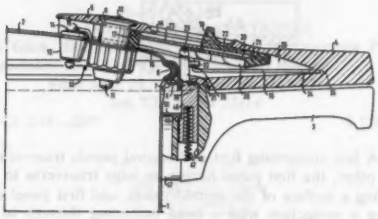
PRESSURE-COOKER

Peter Tess, Hohengang, Germany, assignor to Oberschwabische Metallwarenfabrik GmbH & Co. KG, Riedlingen (Wurttemberg), Germany

Filed Apr. 16, 1975, Ser. No. 568,737

Int. Cl.² B65D *51/16, 45/00*

U.S. Cl. 220—206 **27 Claims**



1. A pressure cooker having pot and lid parts rotatable relative to each other and connectable with each other by a bayonet type joint, and pot and lid handles respectively connectable with each other, comprising:

a pressure limiting valve mounted on said lid;

cockable spring means for manually loading said pressure limiting valve to a desired pressure within a range of pressures within said pressure cooker;

means for locking said pot and lid handles with each other; and

means for cocking said spring only with said lid and pot handles locked together.

3,973,695

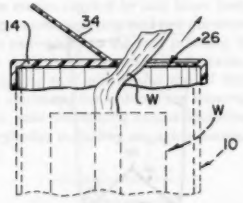
DISPENSER FOR MOIST TISSUES

John B. Ames, 100 Valley Road, Marion, Ala. 36756

Filed Oct. 31, 1975, Ser. No. 627,747

Int. Cl.² B65H *1/00*

U.S. Cl. 221—63 **9 Claims**



1. A dispensing container for dispensing tissues one at a time from a web of perforated tissue material, comprising

a. a body for containing said web, said body having an open upper end,

b. a cap for said body,

c. means formed on said cap and said body for removably securing said cap to said body, and

d. a dispensing outlet formed in said cap, said outlet comprising a generally enlarged portion through which the tip of the leading tissue of the web can be passed to expose such tip exteriorly of the upper surface of the cap, a groove portion extending from one end of said enlarged portion, and a generally circular portion at the opposite end of said groove, said generally circular portion of said outlet functioning to apply tension to the web when the web is pulled from the container, the tension causing the leading tissue to separate at the perforations from the next tissue, with the tension applied to the web by said generally circular portion of said outlet being such that the leading tissues is separated at the perforations so as to leave the tip of the next tissue exteriorly of the cap to facilitate the next dispensing operation.

3,973,696

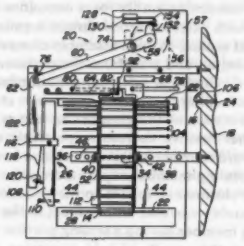
METHOD AND APPARATUS FOR AUTOMATICALLY INJECTING THE FLUID CONTENTS OF A PLURALITY OF PRE-LOADED SYRINGES INTO A GAS CHROMATOGRAPH OR THE LIKE

W. Edward C. Moore, Blacksburg, Va., assignor to VPI Educational Foundation, Blacksburg, Va.

Filed July 23, 1975, Ser. No. 598,515

Int. Cl.² B67D *5/60*

U.S. Cl. 222—1 **11 Claims**



1. Apparatus for sequentially dispensing the fluid contents of a plurality of pre-loaded syringes of the type having a syringe needle, a syringe barrel, and a syringe plunger comprising:

first means for supporting a plurality of syringes and for sequentially placing each of said plurality of syringes in a dispensing position;

second means for depressing the syringe plunger of each syringe positioned in said dispensing position so as to dispense the fluid contents of each said syringe positioned in said dispensing position; and

said first means being operatively disposed for removing each syringe positioned in said dispensing position from said dispensing position after the syringe plunger of said syringe has been depressed by said second means.

10. A method for dispensing the fluid contents of a plurality of pre-loaded syringes of the type having a syringe needle, a syringe barrel and a syringe plunger, said method comprising the steps of:

selectively placing one of a plurality of syringes in a dispensing position;

moving said one syringe in an axial direction from said pre-dispensing position into said dispensing position;

depressing the syringe plunger of said one syringe positioned in said dispensing position so as to dispense the fluid contents thereof;

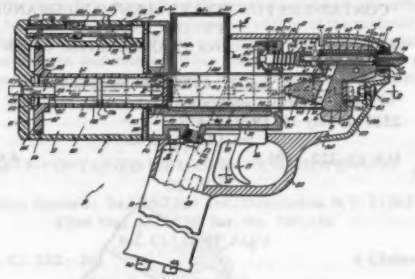
removing said one syringe from said dispensing position after said depressing step has been completed;

then automatically moving a new syringe into a dispensing position.

3,973,697
ADHESIVE GUN

Gerald W. Crum, Elyria; Eric T. Nord, Oberlin; Alan B. Reighard, Bay Village, and Simon Z. Tamny, Lorain, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Division of Ser. No. 307,020, Nov. 16, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,752
Int. Cl.² B67D 5/22
U.S. Cl. 222—47 17 Claims



3. A device adapted to translate a feedstock such as a thermoplastic adhesive from a solid state to a molten state, comprising

a barrel having a ram axially extendable and retractable therein,

a ram motor having a piston head located within a motor housing, and

control valve means adapted to alternately deliver and exhaust motive fluid with respect to at least one face of said piston head,

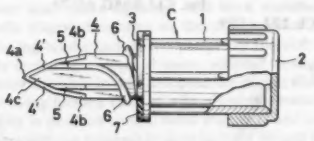
a telltale cooperatively associated with said ram that indicates when recharging of said barrel should take place, the indication being triggered by a specific extended location of said ram inside said barrel, and

said telltale extending exteriorly of the motor housing, said telltale being movable relative to said ram, and said telltale being mechanically actuated by said ram so as to withdraw said telltale interiorly of the motor housing as said ram is extended to that location within said barrel where recharging of the device should take place.

3,973,698
THRUSTING COCK

Noriyoshi Kato, Nagoya, Japan, assignor to Toppan Printing Co., Ltd., Tokyo, Japan

Filed May 19, 1975, Ser. No. 578,430
Claims priority, application Japan, Oct. 8, 1974, 49-121524[U]
Int. Cl.² B67B 7/26
U.S. Cl. 222—91 3 Claims

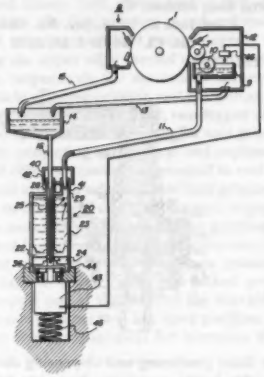


1. A thrusting cock which comprises: a cylindrical body portion; a flange portion integrally formed in the front portion of said body portion; a double-edged knife attached on the front face of and perpendicularly to the central part of said flange, the double-edged portion of said knife having a pointed tip, rear edge portions and outwardly curved edges; auxiliary knives aligned in the same direction with and perpendicularly to said double-edged knife and having rearward inclined edges running from the middle portion of said double-edged portions leaving said tip portion of the double-edged knife; a spiral ridge formed between the rear ends of said auxiliary knives and the front portion of said flange; and a gasket provided between the rear end of said spiral ridge and the front face of said flange; and the central opening of said flange receiving only the plate portions in the rear ends of both the said double-edged knife and auxiliary knives.

3,973,699
LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON

John H. Cook, Sawbridgeworth, England, assignor to Xerox Corporation, Stamford, Conn.

Filed June 11, 1974, Ser. No. 478,183
Claims priority, application United Kingdom, Dec. 21, 1973, 59529/73
Int. Cl.² G01F 11/02
U.S. Cl. 222—108 9 Claims



7. Apparatus as defined in claim 6 wherein said lines comprise valves adapted to be opened by the connection of said lines with said outlet and said inlet means of said tubular housing.

3,973,700
BELLOWS PUMP WITH EXTENSION HAVING INTEGRAL VALVES

Edward C. Schmidt, 2755 Powell Drive, and Miroslav Uroshevich, 2505 Fleetwood Ave., both of Cincinnati, Ohio 45211

Filed Sept. 29, 1975, Ser. No. 617,385
Int. Cl.² B67D 1/02
U.S. Cl. 222—153 15 Claims

1. A fluid pump comprising:

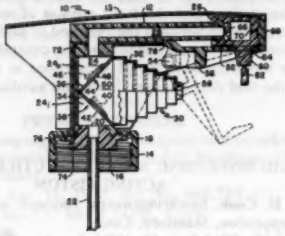
a variable volume, axially collapsible resilient bellows closed at one end and open at the other end;

means for closing said open end, said means including a non-collapsible extension;

an inlet port and an outlet port in said extension; and

a pressure-responsive flexible valve for each of said input and output ports, a respective valve closing said input port and opening said output port in response to a pres-

sure increase within said variable volume, and closing said output port and opening said input port in response



to a decrease in pressure within said volume, said valves being integral with said extension.

3,973,701

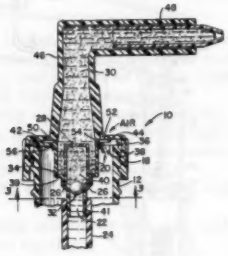
FOAM GENERATING AND DISPENSING DEVICE

Jack C. Gardner, College Park, Ga., assignor to Glasrock Products, Inc., Atlanta, Ga.

Filed June 6, 1975, Ser. No. 584,609

Int. Cl.² B67D *5/58, 3/00*

U.S. Cl. 222—190 **2 Claims**



1. In a foam producing and dispensing device for use with a deformable bottle containing foamable liquid and air, the device including cap means having an internally threaded depending skirt portion for attachment to external threads on the bottle mouth, a central upstanding conduit portion defining a discharge passage in communicating relation with the bottle and an annular surface between the discharge portion and the skirt, a mixing chamber with an inlet at its lower end in communication with a dip tube depending below the level of foamable liquid in the bottle, the mixing chamber being formed by a depending cylindrical wall portion in a sealing washer separate from the cap, air inlet passages through said cylindrical wall portion elevated above the level of liquid in the bottle, a check valve in the mixing chamber inlet and a foam homogenizing element in an outlet at the upper end of the mixing chamber and in communication with the discharge passage, the device being operative on collapsing deformation of the bottle to force the foamable liquid and air into the mixing chamber and deliver foam through the discharge passage, the improvement comprising:

means defining a separate air return inlet through the cap means externally of the mixing chamber to establish direct fluid communication between the atmosphere and the bottle interior, said return air inlet defining means including a pair of continuous inner and outer rib projections extending between said sealing washer and the annular surface of the cap thereby to establish an annular space between said ribs, the cap and said sealing washer isolated from fluid communication with the mixing chamber and the discharge passage, the cap and said washer respectively having apertures formed therein in communication with said annular space; and

means defining a one-way valve operative to present the discharge of fluid from the bottle interior through said apertures in the sealing washer and thus through said air return inlet and to open said air return inlet on a reduction of pressure in the bottle to less than that of the atmosphere.

3,973,702

CONTAINERS FOR PULVERULENT AND GRANULAR PRODUCTS

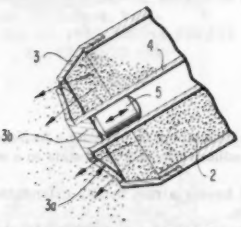
Rafael Ferrante, Catamarca 27, Quilmes, Pcia. Buenos Aires, Argentina

Filed Jan. 21, 1975, Ser. No. 542,705

Claims priority, application Argentina, May 30, 1974, 253992; July 18, 1974, 254772

Int. Cl.² B65G *65/70*

U.S. Cl. 222—196.5 **4 Claims**



1. In dispensing containers for pulverulent material the combination comprising a cap having a closure wall of flexible material provided with a plurality of openings defined by a series of flexible fins, said fins being attached at their outer ends to the periphery of the cap by narrow portions which allow the fins to flex and being joined at their inner ends to a common central area of the flexible closure wall by other narrow portions which allow the fins to flex, a tubular element attached at one end to said common central area and extending downwardly into the container, and a percussion element freely, movably contained within the tubular element, whereby when said dispenser is reciprocally shaken, said fins are flexed as a result of reciprocation of said percussion element to loosen material accumulated on the closure surface.

3,973,703

DEVICE FOR DISCHARGING POWDERY OR GRANULAR MATERIAL

Ivan Anton Peschl, Sterksel, Netherlands, assignor to I.P.T. - Institute for Powder Technology, Schaan-Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 471,842, May 21, 1974, abandoned. This application May 22, 1975, Ser. No. 579,840

Claims priority, application Netherlands, June 5, 1973, 7307777

Int. Cl.² B65G *65/70*

U.S. Cl. 222—199 **12 Claims**

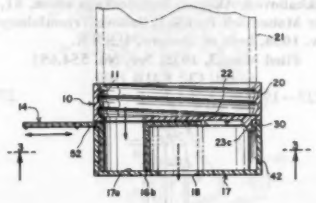
1. A device for the discharge of powdery or granular material from a bunker having an outlet port on the bottom side

thereof and comprising a member mounted for reciprocation and having one or more passages, said device being characterized in that the reciprocatory member is provided with a plurality of strips bounding said passages and being at an angle to the direction of movement of the reciprocatory member and being each at an angle differing from 90° to vertical, the distance between the strips being such that at a standstill of said member a bridge of the material is formed between the top edge of one of said strips and a part of the adjacent strip, and the angle between at least the lower part of said one strip and horizontal, viewed in the direction of flow of the material, is larger than the angle of said one strip at which the material flows through said member when the reciprocatory member comes to a standstill, and means to reciprocate said member in a direction transverse to said strips to cause dispensing.

3,973,704
SELF-CONTAINED MEASURING AND DISPENSING DEVICE

William Horowitz, 243-20 72nd Ave., Douglaston, N.Y. 11363

Filed May 23, 1975, Ser. No. 580,456
Int. Cl.² G01F *11/18*
U.S. Cl. 222—361 **6 Claims**



1. A self-contained measuring and dispensing device for powdered or granular materials comprising:

a cylindrical base having inner threads adapted to be screwed onto a rim of a jar, and having a disc integrally connected to said base formed with an intake opening adjacent a periphery thereof, two spaced parallel rails formed on said disc, said opening being between said two tracks;

a cylindrical cap snap-detachably connected to said base and having a central opening formed in a circular top thereof, and a recess formed at a cylindrical edge thereof adjacent said disc of said base between said rails;

said base including three hook members defining an acute angle isosceles triangle, with the apex of the acute angle at one of said hook members and positioned between said rails, said one hook member being disposed between said two rails at an end thereof diametrically opposite to said intake opening, the other two of said hook members being disposed on opposite sides of said two rails aligned adjacent said intake opening, said hook members being inwardly disposed relative to the periphery of said disc and having hooks facing said periphery thereof;

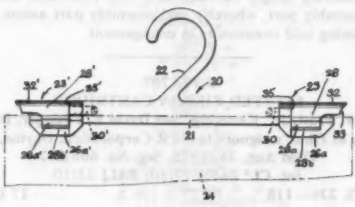
said slide including a stepped recess adapted to engage said first hook member in said first position of said slide; and

said cap being formed therein with abutment means corresponding in position to said hook members and cooperating therewith for releasable snap locking of said cap onto said base and holding said slide member in vertical alignment with said rails, said cap also including a track member adjacent said one hook member extending into said stepped recess and parallel to the axis of said cylinder cap and having thereon one of said abutment means, said stepped recess cooperating with said first hook member and said track member for proper alignment of said cap and said slide, said recess in said cap being diametrically opposite to said track member.

3,973,705
GARMENT CLAMPING HANGER WITH PIVOTED LOCKING CLIP

Marc Erthein, Newberry Road, East Haddam, Conn. 06423

Filed Sept. 25, 1975, Ser. No. 616,840
Int. Cl.² A47J *51/14*
U.S. Cl. 223—96 **10 Claims**

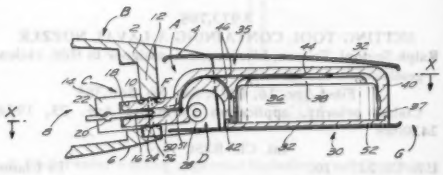


1. A garment hanger comprising an arm carrying at least one clamp integrally formed therewith for suspending a garment from said clamp, said clamp having first and second gripping members, the first gripping member forming part of said arm, said gripping members being hingedly webbed to said arm along the upper edge thereof to form stationary and movable parts respectively for movement between a closed and locked article gripping position and an open and unlocked article releasing position, an inverted, two-legged and substantially U-shaped springable locking clip for said gripping members, a laterally projecting ear integral and coplanar with the rear leg of said clip and pivotally connected to said arm at the rear face of said arm and adjacent said first gripping member whereby each of the legs of said clip becomes engageable with the respective outer faces of each of the gripping members and the inverted U-portion of the clip overlies the hinged web of the gripping members when said clip is rotated over the gripping members to effect closed and locked position, said clip being movable out of the path of the movable gripping member when said member is in any open position, and means on said clip for finger engagement for operation thereof.

3,973,706
CONNECTION FROM WATCHBAND-CARRIED BATTERY TO ELECTRONIC WATCH

Edward J. Boyce, Smithtown Pines, and Harvey Bidner, Plainview, both of N.Y., assignors to Jacoby-Bender, Inc., Woodside, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,171
Int. Cl.² G04B *37/12;* **G04C** *3/00*
U.S. Cl. 224—4 D **44 Claims**



1. A wrist assembly comprising:

a case adapted to receive within a small battery-powered device and having a passage communicating between the inside and outside of said case;

a wristband secured to said case;

at least one battery compartment carried by said wristband;

an electrical conductor operatively connected to said at least one battery compartment;

a first electrical connector attached inside said case adjacent said passage and adapted to be operatively connected to said device;

an assembly part removably fastened to said case in proximity to said first connector and said passage; and

a second connector operatively connected to said electrical conductor and received in said passage in engagement with said first connector, said second connector fitting relatively snugly between said first connector and said assembly part, whereby said assembly part assists in retaining said connectors in engagement.

3,973,707

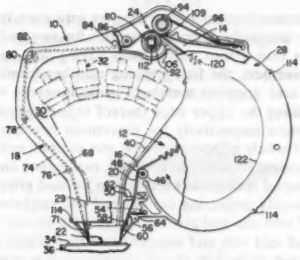
STUFFED RIBBON CARTRIDGE

John W. Pratt, Jr., Kettering, and David E. Filsinger, Dayton, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 28, 1975, Ser. No. 608,807

Int. Cl.² B65H *17/50*; B41J *33/10*

U.S. Cl. 226—118 **17 Claims**



1. A ribbon cartridge comprising a ribbon storage compartment having an entrance area for receiving a ribbon and an exit area through which the ribbon passes to a utilization device;

said storage compartment comprising a floor portion having a first wall and a second wall upstanding from said floor portion with said first and second walls diverging away from each other at said entrance area and converging towards each other at said exit area;

said second wall being formed into a continuous curve having radii of curvature which increase in length from said entrance area to a maximum between the ends of said second wall and then decrease in length to a minimum near said exit area; and

said first wall being formed into a continuous curve having radii of curvature which decrease in length from said entrance area to a minimum at approximately a midpoint in the length of said first wall.

3,973,708

SETTING TOOL CONTAINING A LAVAL NOZZLE

Ralph Scotoni, Triesen, Liechtenstein, assignor to Hilti Aktiengesellschaft, Liechtenstein

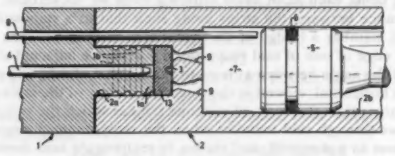
Filed Apr. 16, 1975, Ser. No. 568,385

Claims priority, application Germany, Apr. 25, 1974, 2420089

Int. Cl.² B25C *1/14*

U.S. Cl. 227—10 **11 Claims**

1. A setting tool employing an explosive caseless propellant charge for driving fastening elements into a hard target material, comprises a member forming an axially elongated bore having a rear end and a front end, said member forming a combustion chamber arranged to receive a caseless propellant charge and said combustion chamber located adjacent the rear end of said bore and on the opposite side of said rear end from the front end thereof, said member forming at least one gas flow channel communicating between said combustion chamber and the rear end of said bore, a drive piston movably displaceable through said bore from the rear end toward the front end thereof under the action of an exploded propellant charge and said drive piston being movably displaceable



toward the rear end of the bore after the insertion of a fastening element, wherein the improvement comprises that said gas flow channel is a Laval nozzle, and an axially extending firing pin located within said member rearwardly of said combustion chamber for igniting a propellant charge therein.

3,973,709

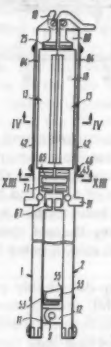
SURGICAL INSTRUMENT FOR STITCHING ORGANS WITH THE AID OF METAL STAPLES

Ernest Mikhailovich Akopov, Dubninskaya ulitsa, 61, kv. 88, and Petr Moiseevich Postolov, Sadovo-Triumfalnaya ulitsa, 4/10, kv. 105a, both of Moscow, U.S.S.R.

Filed Mar. 3, 1975, Ser. No. 554,691

Int. Cl.² B31B *1/00*

U.S. Cl. 227—19 **27 Claims**



1. A surgical instrument for stitching organs with the aid of metal staples in the end-to-end, end-to-side and side-to-side methods, with the working part of the instrument being disposed exteriorly of the organs being stitched, comprising: two clamps; two jaws of each of said clamps for fixing the organs being stitched therebetween, said clamps being pivotally interconnected at one end so that, with the clamps joined, the joint line of said jaws of each of said clamps is perpendicular to the joint line of said clamps; two magazines with slots for staples, each of said magazines being mounted on one of said jaws of each of said clamps; pushers for forcing said staples out of said slots of said magazines; two dies with recesses for bending the staples, each of said dies being disposed on one of said clamp jaws so that said magazines and dies cooperating in the course of stitching are disposed on the jaws of different clamps; a device for mutually aligning the organs to be stitched in a longitudinal direction with respect to said jaws; a means for grasping and fixing the walls of the organs being stitched; four cases of said means mounted on said jaws, one of said cases being secured to each of the jaws; toothed plates secured to said cases and arranged along said jaws; guides formed in said jaws and securing said cases thereto so as to provide for a limited degree of movability of each of said cases in a plane

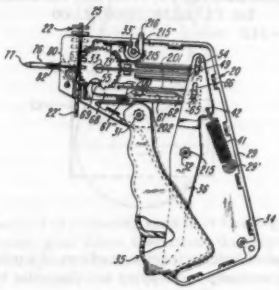
perpendicular to the joint line of said jaws as well as to the joint line of said clamps, such that each of said cases may be set to either one of two extreme positions, a forward position corresponding to the instant of clinching and grasping the walls of the organs being stitched in which the tips of the teeth of said toothed plates are disposed between the butt surfaces of said jaws of said clamps and a certain distance in front of the butt surfaces of the set-apart clamps, and a backward position corresponding to the instant of organ stitching with said clamps joined in which the tips of the teeth of said toothed plates are disposed a certain distance from the butt surfaces of said clamp jaws and approximately in the planes of the butt surfaces of said clamps.

3,973,710

TAG ATTACHER

Larry D. Strausburg, Miamisburg, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed June 17, 1975, Ser. No. 587,745
Int. Cl.² B25C *5/06*
U.S. Cl. 227—67 **19 Claims**



1. Apparatus for attaching tags using fasteners, each fastener including a bar section and a button section joined by a filament section, the apparatus comprising: a body, a needle mounted by the body and having an elongated bore and an elongated slot communicating with the bore, a rigid push rod engageable with the bar section of the fastener for driving the bar section through the bore while its filament section extends through the slot, means for advancing one fastener at a time into alignment with the bore including a toothed member, a movable pawl member having a tooth cooperable with the toothed member, and means for driving the pawl member to advance the toothed member and for driving the push rod, a guide mounted by the body, a flexible resilient elongated arm connected to the pawl member and movable with the pawl member for exerting a force on the guide to urge the pawl tooth into contact with the toothed member, the arm being yieldable to enable the pawl member to deflect slightly as the pawl member moves over a tooth of the toothed member when the pawl member is driven in one direction.

3,973,711

MAGNETIC CRAWLER VEHICLE FOR SOLDERING APPARATUS

Emilio Perego, Milan, Italy, assignor to Compagnia Italiana Montaggi Industriali, Milan, Italy

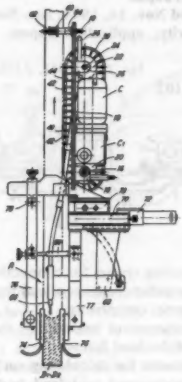
Filed Mar. 6, 1974, Ser. No. 448,761
Claims priority, application Italy, Apr. 3, 1973, 22539/73
Int. Cl.² B23K *37/02*
U.S. Cl. 228—32 **10 Claims**

1. A magnetic crawler vehicle especially adapted for running soldering apparatus along a joint between metal members to be solder-joined, the vehicle being provided with member-engaging endless crawler track means, and means for driving the track means, said track means comprising:

magnetic shoe units which have respective pairs of spaced generally coextensive magnetic pole plates;

said shoe units being articulated in spaced relation in an endless chain disposed inwardly relative to said units and including links;

respective permanent magnets fixed between the pole plates;



said plates having traction shoe surfaces projecting beyond the respective magnets and operable in magnetic traction along said joint;

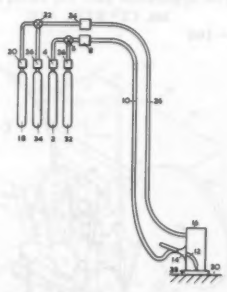
and means pivotally connecting said links to the shoe units generally in the planes of said plates.

3,973,712

UNDERWATER WELDING

John Richard Carew Armstrong, Vancouver, Canada, and Denis John Marshall, Ware, England, assignors to BOC International Limited, London, England

Filed Oct. 16, 1974, Ser. No. 515,197
Int. Cl.² B23K *28/00*
U.S. Cl. 228—57 **9 Claims**



1. Underwater welding apparatus including a welding chamber with at least one boundary surface of the chamber defined by a portion of the workpiece to be welded, a source of gas under pressure in communication with valve means between said chamber and said source of gas, said valve means including demand control means responsive to variations in pressure within said welding chamber caused by variation in pressure externally of said welding chamber to control the flow of gas from said source to the interior of said welding chamber, and selectively increase the flow of gas into said chamber as pres-

sure therein increases, or decrease the flow of gas into said chamber as pressure therein decreases.

3,973,713

WIRE BONDING SYSTEM

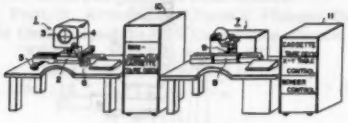
Teruo Furuya, Kodaira; Jun Suzuki, Higashimurayama, and Michio Tanimoto, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 14, 1974, Ser. No. 523,800

Claims priority, application Japan, Nov. 14, 1973, 48-127304

Int. Cl.² H01L *21/92*

U.S. Cl. 228—102 **17 Claims**



1. A wire bonding system for connecting with wires between electrodes on a pellet fixed on a lead frame and lead portions in said lead frame, comprising:

position measurement means for measuring a reference position of the lead frame;

calculating means for calculating each bonding position of said electrodes and said lead portions relative to said reference position on the basis of the result of said measurement; and

wire bonding means provided separately from said position measurement means,

said wire bonding means including means for positioning a bonding head of said wire bonding means in accordance with the calculated bonding positions from said calculating means to carry out the connection with a wire between each said electrode and lead portion.

3,973,714

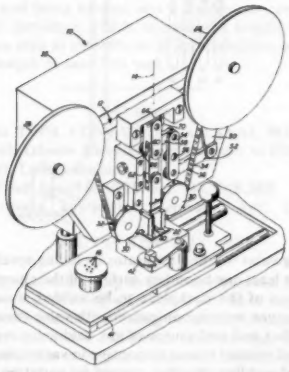
COMPLIANT BONDING METHOD

Joseph N. Lesyk, Allentown; David P. Ludwig, Whitehall, and Jack J. Monahan, Allentown, all of Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Continuation of Ser. No. 383,415, July 27, 1973, abandoned, which is a division of Ser. No. 173,447, Aug. 20, 1971, Pat. No. 3,771,711. This application Jan. 13, 1975, Ser. No. 540,474

Int. Cl.² B23K *1/00*

U.S. Cl. 228—106 **9 Claims**



1. In a method of compliant bonding, wherein a bonding tip is coupled to and supported by a bonding head, wherein the bonding tip moves reciprocally with the bonding head toward and in contact with a workpiece to bond it and away from such workpiece, and wherein a compliant member is positioned with respect to the head between the bonding tip and the workpiece, the improvement comprising:

moving the tip independently of, and relative to, the head to engage a portion of the compliant member, to establish tension in such member and to establish a precise configuration of the engaged portion of said member relative to the tip, such tension and precise configuration being established prior to movement of the head;

maintaining the position of the tip with respect to the head after establishing the tension and the precise configuration in the compliant member; and

moving simultaneously the head, the tip and the compliant member toward the workpiece to effect the bond.

3,973,715

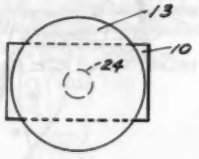
FRICTION WELDING

Ambrose G. Rust, 228 Cedar Blvd., Pittsburgh, Pa. 15228

Continuation of Ser. No. 322,112, Jan. 9, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,339

Int. Cl.² B23K *28/00, 33/00*

U.S. Cl. 228—112 **5 Claims**



1. A method of welding together surfaces of a pair of workpieces having mutually overlapping and dissimilar boundaries comprising the steps of

causing relative movement between said surfaces at an average surface speed of between about 4 and about 25 feet per second,

successively exposing a portion of one of said surfaces to the ambient atmosphere and thereafter excluding air from said one surface portion,

urging said relatively moving surfaces together under pressure between about 7500 and about 15000 pounds per square inch and simultaneously supplying a predetermined quantity of energy of from about 4000 to about 17000 foot-pounds per square inch of weld area to one of the workpieces for frictionally heating and welding said workpieces together at the interface between said workpieces, and

completing the weld within about 650 milliseconds after initial engagement is effected between said surfaces of said workpieces.

3,973,716

PROCESS FOR MAKING A PIECE OF HOLLOW JEWELLERY

Paul Flamand, Garat-Dignac, France, assignor to Flamor S.A., Angouleme, France

Continuation-in-part of Ser. No. 460,039, April 11, 1974, abandoned. This application Dec. 31, 1974, Ser. No. 537,834

Claims priority, application France, Feb. 20, 1974, 74.05676; Dec. 24, 1974, 74.42625

Int. Cl.² B23K *1/04*

U.S. Cl. 228—118 **6 Claims**

1. A process for producing a plate for use in the manufacture of hollow jewellery wherein a sheet of gold or silver having a cleaned surface is to be bonded to a sheet of iron having a cleaned surface, comprising the steps of:

a. applying a pickling, antioxidising product to the peripheral area of said cleaned surface of the sheet of gold or silver and to the peripheral area of said cleaned surface

of the sheet of iron to prevent oxidation during further treatment;

b. bringing the cleaned surfaces of the gold or silver sheet into contact with the surface of the sheet of iron;

c. applying a strip of solder to the ends of the two sheets;

d. applying heat and pressure to said two sheets to form said plate.

3,973,717

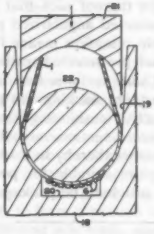
BUSHING FABRICATION

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 21, 1975, Ser. No. 570,151

Int. C.² B21C 37/15

U.S. Cl. 228—144 6 Claims



1. In a method of preparing glass fiber bushings suitable for use in drawing glass fibers therefrom, the steps comprising placing an elongated precious metal sheet having a generally rectangular configuration between a punch and die set provided with staggered rows of projections on the punch and corresponding staggered rows of depressions on the die, mating punch and the die with the precious metal sheet placed between them to produce a plurality of projections on one side of the metal sheet of the shape and size of a desired bushing tip, indexing the sheet along the long axis thereof mating the punch and die and continuing this operation until the desired number of projections have been produced on the precious metal sheet for the desired number of bushing tips, placing the metal sheet below an arcuate male molding member adapted to be received into a semicurved mating mold which has provided in the bottom thereof a cavity for the reception of the projections contained on said sheet, moving the arcuate male molding member on top of the sheet and forcing it into a semicurved shaped in the mating mold such that the projections are located within the cavity, removing the male mold after the sheet has been molded into arcuate form, placing a solid cylindrical rod inside of the mold and on top of the precious metal sheet contained therein, curving the leading edges of the precious metal sheet around the solid rod until they abut each other, removing the rod and welding the seam formed by the abutting edges closed to thereby provide a circular bushing open at each end and provided with a plurality of staggered rows of bushing tips.

3,973,718

METHOD OF MANUFACTURING A HEAT EXCHANGER CORE

Nicholas H. Deschamps, Whippany, N.J., assignor to Deschamps Laboratories, Inc., East Hanover, N.J.

Continuation-in-part of Ser. No. 367,317, June 6, 1973, abandoned. This application Oct. 18, 1974, Ser. No. 516,021

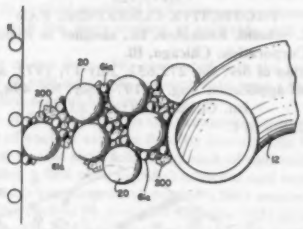
Int. Cl.² B23K 1/04, 35/02

U.S. Cl. 228—183 9 Claims

1. A method of constructing a liquid to gas heat exchanger core comprising the steps of:

placing a metallic tubular element into an open ended container and holding said tubular element and container fixed relative to each other;

substantially filling said container with rounded metallic elements of a first predetermined size and a first predetermined melting point and particles of a similar metallic material having a second predetermined size smaller than said first predetermined size and a second predetermined



melting point lower than said first predetermined melting point, to a level wherein said metallic tubular element is completely surrounded by and is contiguous with said rounded elements and particles, said smaller particles being discrete and loosely introduced into the container;

heating said container and its contents to a temperature between said first and second melting points to melt said particles and fuse said rounded elements to each other and to said metallic tubular element.

3,973,719

CONTAINER HAVING A MEMBRANE-TYPE CLOSURE

Charles Louis Johnson, and Charles Donald Stuard, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 488,101, July 12, 1974, Pat. No. 3,892,351. This application Apr. 7, 1975, Ser. No. 565,902

Int. Cl.² B65D 3/10

U.S. Cl. 229—5.6 2 Claims

1. A thermoplastic overcap for a container subassembly comprising a tubular body having an opening-defining rim and a membrane-type closure, said overcap comprising a top panel and an annular skirt depending from the periphery of said top panel, said top panel comprising heat-deformable means for causing the peripheral section of said closure to conform radially and circumferentially to said rim when said overcap is biased towards said rim by a biasing device presenting a planar surface to the exterior of said top panel while said

heat-deformable means is heated to a sufficiently high temperature to effect said conformation, said heat-deformable means comprising a multiplicity of circumferentially spaced, radially extending, depending integral ribs of thermoplastic material disposed adjacent the perimeter of said top panel so that said ribs overlie said rim when said overcap is applied to said container subassembly.

3,973,720

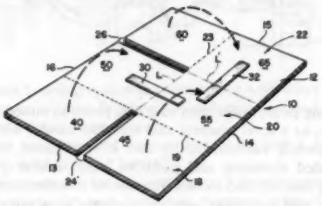
PROTECTIVE CUSHIONING PAD

Donald E. Schmid, Kankakee, Ill., assignor to Republic Packaging Corporation, Chicago, Ill.

Continuation of Ser. No. 272,652, July 17, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,615

Int. Cl.² B65D *81/02, 85/30*

U.S. Cl. 229—14 C **3 Claims**



1. A protective cushioning pad for protecting the edges and corners of articles to be packaged, comprising,

a substantially flat sheet of resilient material,

said sheet of material defined by an L-shaped larger portion including a base portion for the L and an arm portion of the L,

said arm portion of the L having two smaller sections adjoining and extending laterally outwardly from said arm portion of the L such that the two smaller portions adjoin said larger section along a fold line,

said two smaller sections being separated from each other by a first cut-out slot such that said two smaller sections are separated from each other while each is joined to said larger arm portion of the L along a fold line,

the base portion of the L including a smaller section joined thereto and extending upwardly therefrom such that said arm portion of the L-shaped portion forms, with said base portion and said smaller section extending upwardly therefrom a substantially rectangular configuration,

said smaller section extending upwardly from said base portion of the L being separated from the arm portion of the L by a second cut-out slot such that said smaller section is separated from the arm portion of the L by said slot while joined to said base portion of the L along a fold line,

first deformable fold retention means fixedly secured to said arm portion of the L-shaped section approximately midposition thereof and traversing the line formed by said first cut-out slot and said fold line between said smaller section and said base portion,

second deformable fold retention means fixedly secured to said L-shaped portion approximately midposition of the base of said L-shaped portion and traversing the line of said second cut-out slot,

each of said two smaller sections being foldable over and onto said adjoining arm portion of said L-shaped section and in overlying relation with respect to said first deformable fold retention means such that said deformable fold retention means is sandwiched between said arm portion of said L-shaped portion and said adjacent two smaller sections when fully assembled,

said single smaller section extending upwardly from the base portion of said L being foldable over and onto said base portion of said L-shaped portion and in overlying relation with respect to said second deformable fold retention means, such that said second deformable fold retention means is sandwiched between the base portion of said L-shaped section and said smaller section when fully assembled,

and said deformable fold retention means permitting the foldable movement of one-half of said arm portion of said L-shaped portion to be moved arcuately with respect to the opposing one-half portion thereof such that said half sections may assume any pre-selected angularized disposition while said deformable fold retention means functions to retain said half sections in such pre-selected positions and permitting the unfolding of said sections into a substantially flat position for subsequent stacking and storage functions, while said second deformable fold retention means similarly permits the folding movement of the base portion of said L-shaped portion with respect to the arm portion thereof such that said portions may assume any pre-selected angularized position while said second deformable retention means functions to retain said sections in such pre-selected positions and permitting the unfolding of said sections into a substantially flat position for subsequent stacking and storage functions,

whereby said protective cushioning pad results in a pad having three discrete sections arcuately movable with respect to one another thereby to assume an intersecting three plane structure suitable for positioning over the corner end of an article to be packaged.

3,973,721

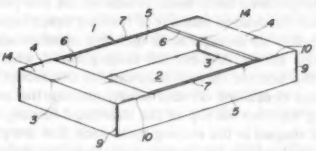
PACKING CASE AND APPARATUS FOR PRODUCING THE SAME

Jun Nakane, Chiba, Japan, assignor to Sekisui Jushi Kabushiki Kaisha and Bandamatic System Service Kabushiki Kaisha, both of Osaka, Japan

Division of Ser. No. 426,078, Dec. 19, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,625

Int. Cl.² B65D *5/20, 5/42*

U.S. Cl. 229—30 **6 Claims**



1. A packing case made of a sheet of thermoplastic material comprising:

a bottom wall;

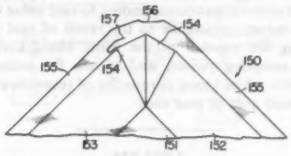
four side walls extending upwardly from said bottom wall at substantially right angles thereto for defining a packing space, the corners of said case connecting said respective side walls being formed by joining and welding the side edges of said side walls together while said side edges are in a molten state; and

a pair of upper side walls extending from the upper corners of two opposing walls of said side walls in an inward direction of said case and defining an opening therebetween, said upper side walls being welded to upper edges of the other two opposing side walls of said four side walls along the end margins thereof so that the upwardly facing surfaces of said upper side walls may be substantially in the same plane as said upper edges of said side walls.

3,973,722
TRAY-LIKE CONTAINER

Masaya Hosoe, Tokyo, Japan, assignor to Machida Shigyo Co., Ltd., Machida, Japan

Filed Apr. 7, 1975, Ser. No. 565,960
Claims priority, application Japan, Apr. 16, 1974, 49-41687; Jan. 9, 1975, 50-4686; Jan. 22, 1975, 50-8680
Int. Cl.² B65D 5/24, 5/26
U.S. Cl. 229—31 R 3 Claims



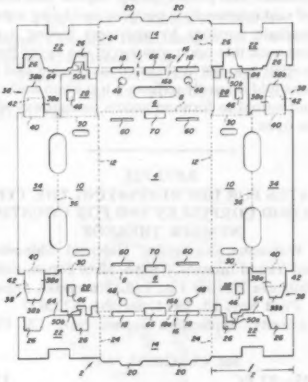
1. A tray-like container of a plastic coated paper blank having plural straight folding line components formed therein for defining a central base panel having four or more even numbers of edges, the same numbers of side walls contiguous with the edges of the base panel, the same numbers of corner portions, each corner portion comprising two equal triangular corner panels interconnecting the adjoining side walls and being inwardly bent to form a portion to be folded on either one of said two adjoining side walls, and a peripheral portion extending along the outer edges of said side walls and said corner portions, wherein the paper blank further has a pig-tail like folding line formed in said peripheral portion adjacent to each said corner portion so as to extend from the straight folding line component by which said peripheral portion and one of said two triangular corner panel of said each corner portion are partitioned, said pig-tail like folding line assisting the outward bending of said peripheral portion so that it forms an outwardly projecting flange of said tray-like container.

3,973,723
FOLDED BLANK CONTAINER INCLUDING TOP PANEL LOCK TAB FEATURE

William E. Owens, Nampa, Idaho, assignor to Boise Cascade Corporation, Boise, Idaho

Filed Jan. 19, 1976, Ser. No. 649,961
Int. Cl.² B65D 5/22
U.S. Cl. 229—33 10 Claims

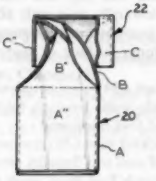
1. A unitary blank (2) for forming a container, comprising
   a. a bottom wall (4) having opposite side and end edges;
   b. a pair of end walls (6) connected with the opposed end edges of said bottom wall by first fold lines (8);
   c. a pair of side walls (10) connected with the side edges of said bottom wall by second fold lines (12);
   d. a pair of end wall flaps (14) connected with the other longitudinal edges of said end walls by third fold line means (16) parallel with said first fold lines, each of said third fold line means containing a pair of spaced locking slots (18) on opposite sides of the central portion thereof;
   e. a pair of end flap wing portions (22) connected with the lateral edges of each of said end wall flaps by fourth fold lines (24) normal to said third fold line, said end flap wing portions having a length greater than half the length of said end wall flaps and being foldable inwardly about said fourth fold lines to overlapping positions upon the inner surface of the associated end wall flap, the longitudinal edges of each of said wing portions adjacent said third fold line containing a pair of recesses (26) opposite said locking slots (18) when said wing portions are in their inwardly folded overlapping positions;
   f. a pair of side wall wing portions (28) connected with the lateral edges of each of said side walls by fifth fold lines (30) normal to said second fold line, said side walls being foldable upwardly about said second fold lines to vertical positions normal to said bottom wall and said side wall wing portions being foldable inwardly about said fifth fold lines to positions normal to both said bottom and side walls, said end walls being foldable upwardly about said first fold lines to vertical positions in contiguous coplanar engagement with the outer surfaces of said side wall wing portions, said end wall flap and end flap wing portions being foldable inwardly as a unit about said third fold lines to vertical positions in contiguous coplanar engagement with the inner surface of said side wall wing portions;
   g. a pair of top flaps (34) connected with the longitudinal edges of said side walls by sixth fold lines (36) parallel with said second fold lines; and
   h. a pair of first locking tabs (38) connected with the lateral edges of each of said top flaps by seventh fold lines (40) normal to said sixth fold lines, each of said locking tabs including a first portion (38*a*) adjacent said seventh fold line and a remote second portion (38*b*) connected with said first portion by an eighth fold line (42) parallel with said seventh fold line, said first locking tab portion being foldable inwardly about said seventh fold line to a position normal to said top flap and said second tab portion being foldable outwardly about said eighth fold line to a position in contiguous coplanar engagement with the outer surface of said first tab portion, said top flaps being foldable inwardly about said sixth fold lines to horizontal positions parallel with said bottom wall to cause the folded second locking tabs to be introduced into the locking slots (18) contained in said third fold lines and into the recesses contained in said end flap wing portions, respectively, said side wall wing portions containing locking apertures (46) opposite said second locking tab portions for receiving in locking engagement the extremities of said second locking tab portion when the second locking tab portions resiliently expand upon the introduction thereof into said recesses, respectively, said end walls containing releasing apertures (48) opposite said locking apertures, whereby upon the insertion of an object into each of said releasing apertures, the second portions of said second locking tab portions are released from engagement from said locking apertures to permit opening of the top flaps of the container.



3,973,724
TWIST-TOP CONTAINER

Laurie Stone, 1058 Glenlake, Chicago, Ill. 60660

Filed Sept. 12, 1975, Ser. No. 612,774
Int. Cl.² B65D 5/08
U.S. Cl. 229—39 R 5 Claims

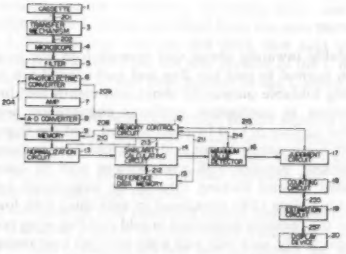


1. A container comprising at least three panels each having an equal length and an equal width; each said panel being joined at the lateral edges thereof to adjacent panels for a lower and upper portion of said length and separated from adjacent panels for an intermediate portion of said length; said lower portions forming side walls for said container and said intermediate and upper portions forming a closure structure for said container; said panels having angular fold lines across the width of said intermediate portions and being separated at said intermediate portions by apertures having a size and configuration such that upon rotation of the upper portions of said panels relative to the lower portions thereof said intermediate portions fold inwardly to form a top when said container is closed and unfold to form an access passageway when said container is open.

3,973,725
APPARATUS FOR DISCRIMINATING THE TYPE OF WHITE BLOOD CORPUSLES AND FOR COUNTING THE NUMBER THEREOF

Sadakazu Watanabe, Kawasaki; Hidenori Shinoda, Yokohama, and Yuichi Imasato, Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 12, 1974, Ser. No. 523,077
Claims priority, application Japan, Nov. 13, 1973, 48-126781
Int. Cl.² G06M 11/00
U.S. Cl. 235—92 PC 13 Claims

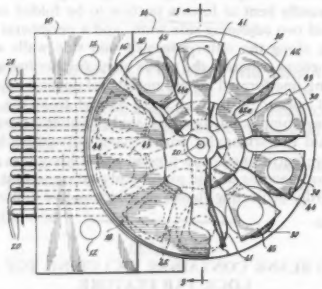


1. Apparatus for discriminating the type and counting the number of white blood corpuscles comprising means for irradiating with light a predetermined area of a slide supporting stained white blood corpuscles, means for producing a microscopic image of said white blood corpuscles which is analyzed into a plurality of given wavelength components over the entire range of visible light, means for producing an electric signal corresponding to the density of light transmitted through each sampling point of the resulting microscopic image of each of said plurality of wavelength components, a memory device for storing said electric signal, means for normalizing said electric signal, means for comparing the normalized electric signal and a reference data signal established for each type of said white blood corpuscles and producing a similarity signal indicating the similarity, means for detecting and storing a first similarity signal corresponding to the maximum similarity and a second similarity signal corresponding to the next maximum similarity thus determined and for detecting and storing the type of the white blood corpuscles corresponding to said maximum value and the type of the white blood corpuscles corresponding to said value next to the maximum, means responsive to the result of said detections for counting the number of the white blood corpuscles at respective sampling points, and means for estimating the number of the white blood corpuscles of respective types in a predetermined area of said slide.

3,973,726
ELECTROMAGNETIC INDICATOR

Donald J. Abel, Franklin Lakes, N.J., assignor to Engineered Sinterings and Plastics, Inc., Watertown, Conn.

Filed Feb. 14, 1975, Ser. No. 549,941
Int. Cl.² G06M 11/04; G08B 5/00
U.S. Cl. 235—92 A 12 Claims

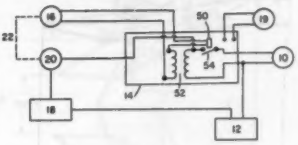


1. Indicating apparatus comprising
A. a rotatable character-bearing member;
B. a rotatable magnet coupled to the character-bearing member for controlling its rotational position, said magnet having outwardly directed flux-receiving surfaces which are diametrically displaced from one another with respect to the axis of rotation of the magnet;
C. a series of electrically energizable coils arranged circumferentially in respect to the axis of rotation of the magnet;
D. a series of magnetic pole pieces respectively electromagnetically coupled with the several coils, each pole piece laying adjacent to the path of movement of the flux-receiving surfaces of the magnet;
E. means defining a significantly isolated flux path magnetically connected with and extending away from each of the said pole pieces, each such flux path
i. extending first generally parallel to, then diametrally with respect to the axis of rotation of the magnet; and
ii. being terminally magnetically coupled to a flux concentrator lying adjacent to the path of movement of the flux receiving surfaces of the magnet in a location diametrically displaced from the particular pole piece associated with that flux path; and
F. conductive connections to the several coils for separately energizing them, thereby to rotate the magnet and the character-bearing member to desired indicating positions.

3,973,727
THERMOSTATICALLY CONTROLLED SAFETY DEVICE FOR OIL BURNERS

Joseph E. Scalzo, and John Tulowitzki, both c/o 234 E. College Ave., State College, Pa. 16801

Filed Nov. 18, 1974, Ser. No. 524,961
Int. Cl.² F23N 5/24
U.S. Cl. 236—11 6 Claims



1. In a hot air oil burning furnace comprising in combination:

an oil burner electrically connected to a power source through a limit switch and a control circuit; a low voltage thermostat electrically connected to said control circuit, adapted to activate said oil burner in response to the temperature sensed by said low voltage thermostat;

a thermostatically controlled safety device, comprising in combination:

a line voltage thermostat electrically connected between said limit switch and said control circuit;

means for said line voltage thermostat to shut off said oil burner in response to the temperature sensed by said line voltage thermostat;

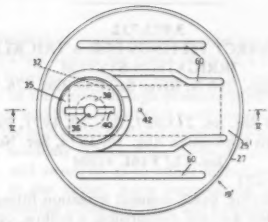
means for setting said line voltage thermostat at a temperature above that of said low voltage thermostat;

said line voltage thermostat being positioned in the same location as said low voltage thermostat.

3,973,728
THERMAL SENSOR

Brian Frank Colenutt, Southampton, England, assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 471,272, May 20, 1974, abandoned. This application July 24, 1975, Ser. No. 598,735
Claims priority, application United Kingdom, May 24, 1973, 24791/73
Int. Cl.² G05D 23/08
U.S. Cl. 236—13 4 Claims

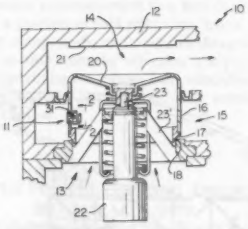


1. A thermal sensor adapted for use in an internal combustion engine induction system having an inlet for air at ambient temperature and an inlet for heated air, valve means controlling air flow through said inlets, a vacuum motor positioning said valve means to allow heated air flow in direct relation and ambient temperature air in inverse relation with a vacuum signal and having a fitting for receiving the vacuum signal, and a source of vacuum, said thermal sensor comprising first and second shells defining a chamber therebetween, at least one of said shells being adapted for exposure to the air flow in said induction system downstream of said inlets and being formed of metal to provide rapid heat transfer to and from said chamber, fitting means adapted to connect said chamber to said vacuum source to create a subatmospheric pressure in said chamber, one of said shells having an air bleed opening into said chamber for admitting air to increase the pressure therein and further having a valve seat surrounding said air bleed within said chamber, a spherical valve ball formed of nonhygroscopic plastic associated with said valve seat for varying air flow through said air bleed to create a controlled vacuum signal within said chamber, and a bimetal strip disposed within said chamber and biasing said ball toward said valve seat with a force that varies inversely with the temperature created by heat transfer through said metal shell to cause said ball to admit air through said air bleed to create a vacuum signal which varies inversely with such temperature, said fitting means being further adapted to connect said chamber to said vacuum motor fitting to deliver said vacuum signal to said vacuum motor whereby said vacuum motor may position said valve means to allow increased heated air flow and decreased ambient temperature air flow when the induction air flow downstream of said inlets is below a predetermined temperature and to allow decreased heated air flow and increased ambient temperature air flow when the induction air flow downstream of said inlets is above the predetermined temperature.

3,973,729
VENT VALVE ARRANGEMENT

Boyd P. Sliger, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Feb. 20, 1975, Ser. No. 551,282
Int. Cl.² F01P 7/16
U.S. Cl. 236—34.5 9 Claims



1. In a thermostatically operated valve construction having a valve member for opening and closing a valve seat in response to temperature sensed by a temperature responsive device that is interconnected to said valve member to move the same relative to said valve seat and having a vent valve arrangement for permitting fluid flow through said valve seat when said valve seat is closed by said valve member, the improvement wherein said vent valve arrangement has a one-piece valve seat member provided with a valve seat opening and a chamber for containing a movable valve member therein, and a movable valve member of said vent valve arrangement being contained in said chamber by the configuration of said one-piece valve seat member for opening and closing said valve seat opening, said one-piece valve seat member having an open end spaced from said valve seat opening, said one-piece valve seat member having a single integral tab extension thereof disposed adjacent said open end to contain said valve member of said vent valve arrangement in said chamber, said integral tab extension being bent into substantially an L-shaped configuration with one leg thereof being an extension of said open end and the other leg thereof being disposed in front of and spaced outwardly from said open end.

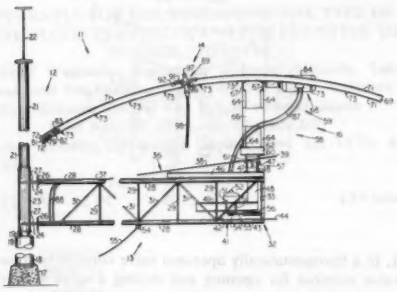
4. In a thermostatically operated valve construction having a valve member for opening and closing a valve seat in response to temperature sensed by a temperature responsive device that is interconnected to said valve member to move the same relative to said valve seat and having a vent valve arrangement for permitting fluid flow through said valve seat when said valve seat is closed by said valve member, the improvement wherein said vent valve arrangement has a one-piece valve seat member provided with a valve seat opening and a chamber for containing a movable valve member therein, and a movable valve member of said vent valve arrangement being contained in said chamber by the configuration of said one-piece valve seat member for opening and closing said valve seat opening, said one-piece valve seat member of said vent valve arrangement comprising a tubular member having a reduced portion defining said valve seat opening thereof at the juncture with a non-reduced portion thereof, said non-reduced portion of said one-piece valve seat member defining said chamber, said non-reduced portion of said one-piece valve seat member having an open end spaced from said valve seat opening, said non-reduced portion having a single integral tab extension thereof disposed adjacent said open end to contain said valve member of said vent valve arrangement in said chamber, said integral tab extension being bent into substantially an L-shaped configuration with one leg thereof being an extension of said reduced portion and the other leg thereof being disposed in front of and spaced outwardly from said open end.

3,973,730

APPARATUS FOR APPLYING REFRACTORY COATING TO THE ROOF LININGS OF ELECTRIC ARC FURNACES

John David Johnson, P. O. Box 300, Montpelier, Iowa 52759

Filed June 25, 1975, Ser. No. 590,068
Int. Cl.² B05B *3/18*
U.S. Cl. 239—186 **10 Claims**



1. an apparatus, for applying refractory coating to the roof lining of a swing type, top-charging electric-arc furnace, comprising:

a main upstanding support affixed to the floor proximate to the furnace;

a truss member rotatably attached at one end to said main support and having an outwardly extended end;

means for spraying refractory coating; and

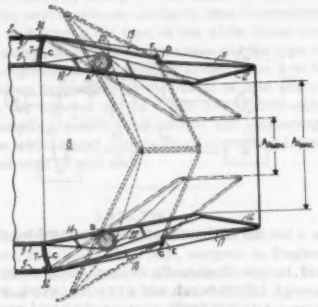
means for forming an arcuate path having the same radius of curvature as the roof lining of the furnace and holding and moving said means for spraying back and forth along said arcuate path and simultaneously rotating said arcuate path, said means for forming, holding and moving being rotatably attached to said outwardly extended end, said truss member rotating about said main support to swing said means for forming, holding and moving directly under the roof of the furnace when the roof is swung outwardly from the furnace, whereby said means for spraying is held and moved along the roof lining proximate thereto to direct refractory coating thereon.

3,973,731

FLAP-TYPE TWO-DIMENSIONAL NOZZLE

Edward B. Thayer, Hobe Sound, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,377
Int. Cl.² B64C *15/06*
U.S. Cl. 239—265.39 **5 Claims**



1. A flap-type, two-dimensional nozzle having a rectangular inlet, fixed sides extending rearwardly from each side of said inlet, a pivotally mounted convergent top flap, said pivotally mounted convergent top flap being pivotally mounted on a first axis between said fixed sides, said first axis of said convergent top flap being located between its ends, a pivotally mounted convergent bottom flap, said pivotally mounted convergent bottom flap being pivotally mounted on a second axis between said fixed sides, said second axis of said convergent bottom flap being located between its ends, a divergent top flap, said divergent top flap having its forward end pivotally mounted to the rearward end of said convergent top flap, a divergent bottom flap, said divergent bottom flap having its forward end pivotally mounted to the rearward end of said convergent bottom flap, a top external flap, said top external flap having its forward end pivotally mounted between said fixed sides and the rearward end of said top external flap being pivotally mounted to the rearward end of said top divergent flap, a bottom external flap, said bottom external flap having its forward end pivotally mounted between said fixed sides and the rearward end of said bottom external flap being pivotally mounted to the rearward end of said bottom divergent flap, means for actuating said plurality of said top flaps and said bottom flaps.

3,973,732

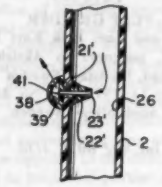
QUICK-CONNECT FITTINGS FOR A TRICKLE TYPE IRRIGATION SYSTEM

Richard E. Diggs, 210 N. River St., P.O. Box 776, Carthage, Mo. 64836

Division of Ser. No. 213,927, Dec. 30, 1971, Pat. No. 3,833,019. This application Aug. 16, 1974, Ser. No. 498,181
Int. Cl.² F16L *41/04*
U.S. Cl. 239—271 **1 Claim**

1. A self-piercing, quick-connect irrigation fitting for trickle-type irrigation systems, comprising: a hollow, open-ended, semicylindrical, synthetic plastic body having a flat, planar side, the hollow interior of the body being semicylindrical and extending the length of the body; a projection on the center of said flat side of said body terminating in a sharpened free end; and tapered, enlarged piercing head on the free end of the projection defining an annular retaining shoulder facing away from the free end toward the body; the axis of the projection disposed perpendicular to the axis of the open-ended semicylindrical body; and a restricted passageway extending through the projection from the free end thereof to the hollow body, said hollow body thus defining a shrouded outlet against

which water impinges as it passes from the restricted passageway when the fitting is attached to a water-containing conduit to effect flow of water from the open ends of the semicylindrical body to irrigate a localized area, said sharpened end adapted to penetrate the wall of a conduit whereby the shoulder engages behind the wall to retain the fitting in place.



3,973,733

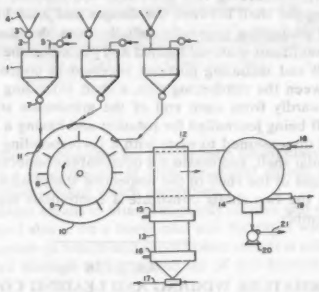
METHOD AND APPARATUS FOR COMMINUTION OF COAL AND OTHER MATERIALS TO ULTRAFINE SIZES

George W. Switzer, Midlothian, Va., assignor to Gilbert Associates Inc., Reading, Pa.

Continuation-in-part of Ser. No. 327,874, Jan. 29, 1973, abandoned. This application Sept. 13, 1974, Ser. No. 505,677

Int. Cl.² B02C *19/00*

U.S. Cl. 241—1 4 Claims



1. The method of comminuting porous particles, such as coal, to ultra-fine size of the order of about 1 to 10 microns, comprising introducing said particles into a vessel, subjecting the interior of the vessel to high pressure superheated steam which infuses into the pores of said particles and equalizes the pressure in the pores with that surrounding the particles within said vessel, suddenly reducing the pressure surrounding said particles in said vessel so as to effect higher pressure in the pores than in the vessel space surrounding said particles, resulting in bursting of the particles, and expanding said steam by opening outlet means of said vessel and passing the steam and coal particles into a housing through a plurality of nozzles leading into the interior of said housing and positioned along spaced peripheral points thereof so as to discharge the steam and coal particles against the blades of a paddle wheel driven therein but in a direction opposite to that in which said wheel is driven so as to effect further breakage of said particles from expansion and collision through said nozzle means as well as further breakage from collision with the blades of said paddle wheel to provide particles of ultra fine size which are discharged from said housing into a separator from which the broken particles are discharged.

3,973,734

FROTH FLOTATION PROCESS

Edward C. Rosar, Lakewood; John R. Hobaugh, Denver, and Vuko M. Lepetic, Lakewood, all of Colo., assignors to Industrial Resources, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 190,416, Oct. 18, 1971, Pat. No. 3,806,044. This application Apr. 22, 1974, Ser. No. 462,725

The portion of the term of this patent subsequent to Apr. 23, 1992, has been disclaimed.

Int. Cl.² B02C *21/00*

U.S. Cl. 241—20 36 Claims

1. A froth flotation process comprising the steps of:
   a. providing an ore comprising kerogen-containing rock and authigenic sodium mineralization, said sodium mineralization including:
      i. dawsonite, and
      ii. nahcolite, trona, corresponding sodium compounds, and mixtures thereof,
   b. crushing said ore to a size that provides liberation therefrom trona, corresponding sodium compounds and mixtures thereof of said nahcolite without liberating from said rock substantial amounts of kerogens,
   c. said crushing step produces a head of said kerogen-containing rock having said sodium mineralization commingled therewith,
   d. pulping said head in an aqueous brine solution,
   e. said aqueous brine solution contains sodium cations and carbonate anions selected from $CO_3^{=}$, HCO_3^{-}, and mixtures thereof,
   f. said brine having a pH above about 7.0, and being substantially devoid of Cl^{-} anions contributed by other than said head,
   g. contacting said pulped head-brine mixture with a gas to form a froth,
   h. collecting a portion of said kerogen-containing rock and said dawsonite mineralization in a first float portion,
   i. collecting a portion of said nahcolite, trona, corresponding sodium compounds, and mixtures thereof in a second, non-float portion, thereby effecting a separation of said kerogen-containing rock from said nahcolite, trona, corresponding sodium compounds, and mixtures thereof mineralization.

3,973,735

APPARATUS FOR PULVERIZING AND SORTING MUNICIPAL WASTE

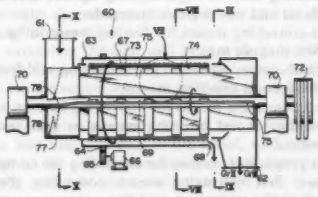
Kanichi Ito, Yokohama; Yoshio Hirayama, Zushi; Ryoichi Takeuchi, Kamakura, and Masao Nomoto, Tokyo, all of Japan, assignors to Keishin Matsumoto, President of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,651

Claims priority, application Japan, Apr. 1, 1974, 48-36741; Apr. 19, 1974, 48-44242; Aug. 21, 1974, 48-95686; Aug. 23, 1974, 48-96701

Int. Cl.² B02C *23/16*

U.S. Cl. 241—73 16 Claims



1. An apparatus for size-reducing and sorting waste, said apparatus comprising:

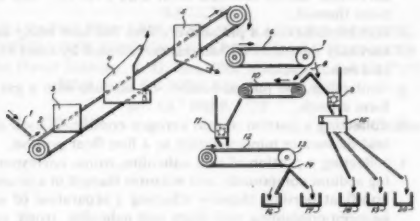
a hollow cylindrical screen;
a plurality of elongated ridge-like projections on the inner surface of said screen;
a rotatable shaft longitudinally fitted through said cylindrical screen;
a plurality of beaters mounted on said shaft for rotation therewith said beaters extending radially from said shaft and opposing said projections inside said cylindrical screen;
anti-entangling means connected to said beaters and said shaft for preventing elongated constituents of waste being treated from entangling about said shaft;
first rotating means connected to said shaft for rotating said shaft within said cylindrical screen; and
second rotating means contacting said cylindrical screen for rotating said screen relative to said shaft therethrough.

3,973,736

SYSTEM FOR ASSORTING SOLID WASTE MATERIAL AND PREPARATION OF SAME FOR RECOVERY

Claes Torsten Nilsson, Loddekopinge, Sweden, assignor to Aktiebolaget Platmanufaktur, Malmo, Sweden

Filed July 31, 1974, Ser. No. 493,222
Claims priority, application Sweden, Aug. 9, 1973, 7310899
Int. Cl.² B02C *23/14*
U.S. Cl. 241—76 4 Claims



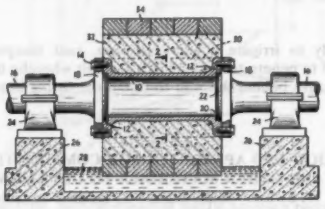
1. An installation for recovering salvagable components from solid compacted waste materials including glass, ferrous metal, aluminum and other non-ferrous metals, organic and non-organic components, said installation comprising:
first magnet means for separating ferrous metal from non-ferrous material;
first crushing means for crushing non-ferrous material;
second crushing means for crushing said ferrous metal;
divider means coacting with the first magnet means for respectively directing non-ferrous material separated at said first magnet means to the first crushing means and ferrous metal separated at said first magnet means to the second crushing means;
separating means coacting with the second crushing means, said separating means including second magnet means for separating additional non-ferrous material from said ferrous metal;
collecting stations for collecting therein sorted-out ferrous metal and non-ferrous materials;
first conveying means for feeding waste to be sorted to the first magnet means;
second conveying means for conveying said ferrous metal to the second crushing means;
third conveying means for conveying ferrous metal crushed in the second crushing means to said second magnet means;
first preparatory means for shredding the compacted waste, said first conveying means conveying the compacted waste to and through said first preparatory means prior to feeding the waste to the first magnet means; and
second preparatory means for subjecting waste shredded in the first preparatory means to the action of air jets for blowing lightweight parts from the waste, said first conveying means conveying the waste from the first preparatory means through the second preparatory means to the first magnet means.

3,973,737

PULP GRINDER

Sven-Erik Thorsell, and Lars Erik Karl Axel Tell, both of Karlstad, Sweden, assignors to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed May 14, 1974, Ser. No. 469,913
Claims priority, application Sweden, May 14, 1973, 7306741
Int. Cl.² B02C *4/30*
U.S. Cl. 241—294 2 Claims



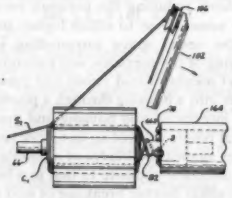
1. In a pulp grinder for the mechanical production of fibrous pulp, the improvement in the grindstone thereof comprising a grindstone structure including a tubular shell having a flange at either end and a multiplicity of circumferentially spaced-apart, reinforcing ribs extending continuously longitudinally along the shell between the flanges and joined to the flanges and projecting generally radially from the shell, a body of cementitious material formed and placed on the outside of the shell and including portions received in concavities defined between the reinforcing ribs, a shaft extending coaxially and outwardly from each end of the grindstone structure, each shaft being journalled for rotation and having a flange shaped and dimensioned to mate with a corresponding flange on the tubular shell, and means for detachably connecting the mating flanges of the shell of the respective shafts such that the shell and the two shafts constitute a continuous supporting shaft assembly.

3,973,738

ARMATURE WINDING AND LEADING CONNECTING MACHINE

Jerry E. Miller, Dayton, Ohio, assignor to The Globe Tool and Engineering Company, Dayton, Ohio

Continuation of Ser. No. 871,191, Oct. 15, 1969, abandoned, which is a division of Ser. No. 704,342, Feb. 9, 1968, Pat. No. 3,506,864. This application Feb. 10, 1972, Ser. No. 225,260
Int. Cl.² H02k *15/09*, *15/095*
U.S. Cl. 242—7.05 B 13 Claims



1. In an automatic armature winding machine of the type having a flier which is rotated to wind coils into armature slots in an armature core mounted on an armature shaft, the improvement comprising armature rotating means engaging and

rotating said armature shaft about its longitudinal axis at the end of the winding of one coil through an angle significantly greater than the angle between adjacent ones of said armature slots and sufficient to locate a pair of said armature slots substantially in a position to receive the next succeeding coil to be wound by said flier, flier drive and control means controlling the rotation of said flier operative to cause said flier to rotate after said pair of slots are so located to wind the next succeeding coil, whereby the wire leading from said one coil extends in one direction about said armature shaft to said next succeeding coil, and means to connect a portion of said wire leading from said one coil to a commutator segment on said armature shaft including means selectively shielding and exposing a selected commutator tang and means rotating said flier in a direction opposite to the direction said flier is rotated to wind the coil to hook said portion of said lead wire about said selected commutator tang when exposed.

3,973,739
WINDING APPARATUS

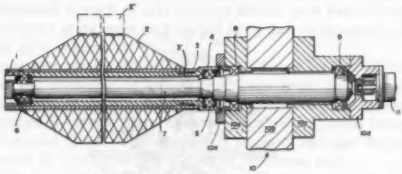
Heinrich Nilgens, Budenheim; Karl Ostertag, Erlenbach, and Herbert Scheiber, Kleinwallstadt, all of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Dec. 6, 1974, Ser. No. 530,348

Claims priority, application Germany, Dec. 21, 1973, 2363768

Int. Cl.² B65H *54/02, 79/00*

U.S. Cl. 242—18 R **8 Claims**



1. In a winding apparatus for producing a filamentary spool package on a spool sleeve at high rotational speeds of the spool, the improvement which comprises:

a spool holder means to interchangeably receive and engage said spool sleeve on a horizontal axis for rapid winding;

a spool carrier on which said spool holder means is rotatably mounted through a first paired set of anti-friction bearings;

a multi-element assembled supporting member on which said spool carrier is cantilevered and rotatably mounted only at its inboard end, which extends axially from said spool holder means, through a second paired set of anti-friction bearings, each set of bearings being contained in a separately assembled element adjacent either end of said supporting member; and

means for driving said spool carrier relative to said spool holder means at a rate proportionately slower than said spool holder means.

3,973,740
FILM REEL SPACER

Martin M. Schankler, East Brunswick, N.J., assignor to Microfilm Enterprises Corporation, East Brunswick, N.J.

Filed Oct. 7, 1975, Ser. No. 620,428

Int. Cl.² B65H *17/02*

U.S. Cl. 242—68.5 **8 Claims**

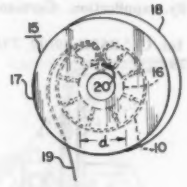
1. An annular spacing member for use in conjunction with a reel comprising a cylindrical hub having a circular cross-section with a given outer diameter and a pair of spaced parallel circular side flanges affixed to said hub,

said spacing member having a circular outer configuration with an outer diameter greater than the outer diameter of said hub and less than the diameter of either of said flanges,

the width of said member being slightly less than the space between said flanges,

said member having at least three inwardly extending spacing means, the innermost extremities of said spacing means defining a circle having a diameter substantially equal to the outer diameter of said hub,

said member comprising a unitary structure of resilient material having adjacent separable arcuate end portions,



said end portions being deflectable and separable a distance at least equal to the outer diameter of said hub, so that said member can be installed on said hub by separating said end portions and sliding the thus opened member onto said hub, said end portions of said member being urged into adjacent relationship by the resilience of said member,

said member when disposed about said hub serving to effectively increase the outer diameter thereof for any flexible strip material which may be wound thereon.

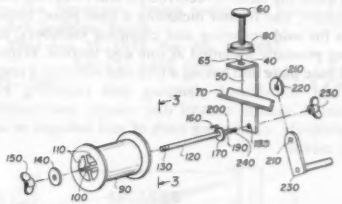
3,973,741
FISHING LINE CHANGER

Melvin Dean, Los Angeles, Calif., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Apr. 4, 1975, Ser. No. 564,993

Int. Cl.² A01K *89/00*

U.S. Cl. 242—84.1 R **2 Claims**



1. A fishing line changer for use with a fishing rod having a reel thereon, the axis of the reel being disposed at right angles to the rod, said changer comprising:

a cylindrically shaped spool having a bore and an off center opening in one end;

an axle extending through said bore with at least one exposed end, said end having a circular cross section, said axle having a region adjacent said end which has a square cross section;

a right angled prong secured to said axle intermediate said region and said one end of the spool, said prong being parallel to the axle and engaging said off center opening whereby said axle and spool rotate as a unit;

means supporting the axle in a manner at which the axle is free to rotate, the means detachably securing the spool to said rod in a manner at which the axis of the spool is parallel to the axis of the reel;

a crank detachably securable to said region for enabling line to be transferred from the reel to the spool; and

a disc detachably securable to said region for enabling line to be transferred from the spool to the reel.

3,973,742

SELF-CENTERING COIL HOLDER

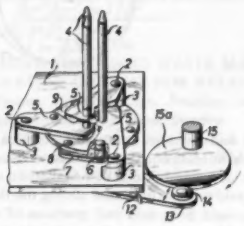
Dietmar Engelhardt, Monchen-Gladbach, and Hans Raasch, Rheydt, both of Germany, assignors to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Jan. 8, 1975, Ser. No. 539,423

Claims priority, application Germany, Jan. 9, 1974, 2400853

Int. Cl.² B65H *49/00, 75/22*

U.S. Cl. 242—129 3 Claims



1. Self-centering holder for hollow textile coils of varied lengths and diameters comprising at least two rod-shaped, substantially parallel-extending centering and clamping members, means comprising support and adjusting members for said centering and clamping members, said at least two centering and clamping members being mounted on said support and adjusting members and being respectively pivotable into a position wherein a hollow textile coil of given diameter is receivable over said centering and clamping members collectively and wherein the latter are in pressing engagement with the inner surface of the hollow textile coil, said support and adjusting members being located outside the hollow textile coil when the latter is received on said centering and clamping members, and further including a base plate, respective linkages for said centering and clamping members, said linkage being pivotally mounted at one end thereof, respectively, on said base plate and having a free end whereon a respective one of said rod-shaped clamping and centering members is mounted, central control disc means, and coupling means, respectively, connecting each of said linkages to said control disc means.

3,973,743

AUTOMATIC SWITCH-OFF SYSTEM IN A CASSETTE TAPE RECORDER

Nobuo Suzuki, Sagamihara, Japan, assignor to Technical Incorporated, Japan

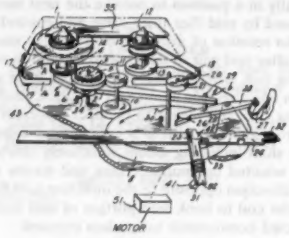
Filed Feb. 24, 1975, Ser. No. 552,266

Claims priority, application Japan, Mar. 5, 1974, 49-25501

Int. Cl.² B65H *59/38;* G03B *1/04;* G11B *15/32*

U.S. Cl. 242—186 6 Claims

1. An automatic tape recorder actuator comprising a frame member, an oscillating arm member pivotally supported by said frame member and spring biased in a first direction, a tape reel shaft rotatably supported on said oscillating arm, a tape cassette with at least one tape reel receivable on said tape reel shaft, a set holder lever slidably mounted relative to said frame, a lever with one end formed into a curved surface and pivotally supported by said set holder lever, a spring mounted between said frame member and said lever, a first pin mounted on said lever and engageable with said oscillating arm lever, a drive pulley rotatably supported by said frame member, a second pin mounted on said drive pulley and engageable with said curved surface of said lever when said



holder lever rotates under stop demand conditions to move said set holder lever to stop said tape recorder.

3,973,744

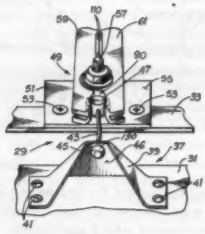
LATCHING MECHANISM

Roland D. Hintzman, San Mateo, Calif., assignor to Sargent Industries, Inc., Los Angeles, Calif.

Filed June 12, 1975, Ser. No. 586,263

Int. Cl.² B64D *25/14*

U.S. Cl. 244—137 P 28 Claims



1. An emergency debarkation system adapted for use with an aircraft having a door movable relative to a floor of the aircraft, the system being operable to facilitate the emergency debarkation of personnel in the aircraft, including:

a first container member mounted on the door of the aircraft;

a second container member hingeably mounted on the first container member and defining with the first container member a container;

inflatable means disposed in the container and being automatically deployable with the opening of the container to provide a slide or slide/raft for the debarkation of the personnel in the aircraft;

a first latch assembly attached to one of the first container member and the second container member;

a second latch assembly attached to the other of the first container member and the second container member and having an engaging relationship with the first latch assembly to secure the container when the container is closed;

locking means cooperating with the second latch assembly for positively locking the second latch assembly in the engaging relationship with the first latch assembly to inhibit opening of the container; and

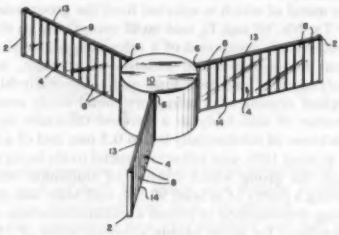
means for fixing the locking means to the floor of the aircraft to activate the locking means with the opening of the door of the aircraft to permit the opening of the container and the deploying of the inflatable means.

3,973,745

SOLAR CELL ARRANGEMENT FOR A SPIN STABILIZED VEHICLE

Robert E. Coltrin, Manhattan Beach; Thomas C. Eakins, Rancho Palos Verdes, and John E. McIntyre, Los Alamitos, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 30, 1974, Ser. No. 519,387
Int. Cl.² B64G 1/10
U.S. Cl. 244—173 4 Claims



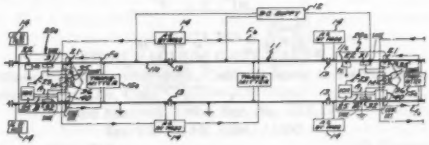
1. An apparatus comprising:
a body intended for spinning;
at least two stowage boxes supported by said body in corresponding positions adjacent said body, a flexible panel disposed in each of said stowage boxes, each panel being coupled at its inner end to said body and at its outer end to its stowage box;
means mounting each of said stowage boxes for movement in the presence of centrifugal force from its position adjacent said body to a deployed position radially displaced from said bosy, each of said flexible panels being removed from its stowage box as said stowage boxes move to corresponding deployed positions; and
means coupled to said body and to said stowage boxes for controlling movement of said stowage boxes from said positions adjacent said body to said deployed positions.

3,973,746

COLLISION AVOIDANCE SYSTEM

Kenneth H. Ball, Tarzana, Calif., assignor to Walt Disney Productions, Burbank, Calif.

Filed May 2, 1975, Ser. No. 573,847
Int. Cl.² B61L 3/10, 3/20
U.S. Cl. 246—187 B 15 Claims



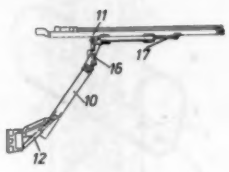
11. A control signalling system adapted for use in electrical trains powered by connection to electrical conduits, comprising:
a plurality of first and second transmitters alternately connected to said conduits, each correspondingly imposing first and second control signals thereon, said first and second control signals being of discrete and separated frequencies, all of said first control signals being further within a first bandpass range and all said second conrol signals being within a second bandpass range, the frequency separations between said first control signals within said first bandpass range and said second control signals in said second bandpass range being greater than the response bandpass range of said train.

3,973,747

METHOD OF AND ARRANGEMENT FOR CONTROLLING THE SPEED OF THE MOVEMENTS OF HYDRAULIC BOOMS

Axel Henry Jügerstrom, Tyreso, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Oct. 18, 1974, Ser. No. 515,845
Claims priority, application Sweden, Oct. 24, 1973, 7314399
Int. Cl.² E21C 5/11, 9/00, 11/00
U.S. Cl. 248—16 15 Claims



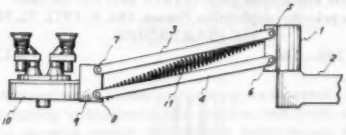
1. In a method of controlling the speed of the movements of a working implement, said working implement being movable three-dimensionally in space by hydraulic motors and carried by a hydraulic boom, said hydraulic boom being pivotally arranged with respect to a support, and a hydraulic circuit being provided for said hydraulic motors for providing a return flow from said hydraulic motors to low pressure,
the improvement comprising:
selectively ramifying the return flow manually into one of at least two return flow branches, and
providing flow restriction in at least said one of said branches for decreasing the speed of movement of the working implement in a step of a predetermined amount which is a function of the size of the restriction so as to obtain an accurate inching.

3,973,748

SUSTAINING DEVICE

Masuo Nagasaka, Neyagawa, Japan, assignor to Konan Camera Research Institute, Japan

Filed Jan. 31, 1975, Ser. No. 545,987
Int. Cl.² A47F 5/00
U.S. Cl. 248—280 1 Claim

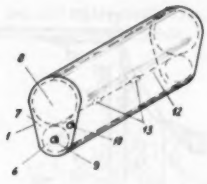


1. A sustaining device comprising a stationary member, a floating member for holding an article, a pair of vertically spaced parallel bars each pivoted at one end to the stationary member and at the other end to said floating member whereby said four pivots form the corners of a parallelogram, said floating member having a bottom surface portion curved in the plane of said bars, a flexible strip secured at one end to a point on said curved surface spaced outwardly from the pivots on said other ends of said bars and a spring connected between the other end of said strip and a point adjoining the upper one of the pivots on the stationary member, the contour of said curved surface being selected to produce in combination with said spring a moment about said pivots to substantially equalize the moment produced by said article.

3,973,749
HOLLOW FORMWORK ELEMENTS FOR PRODUCING CONCRETE STRUCTURES

Franz Friedl, Vienna; Erich Köhler; Hans Höller, both of Pottschach, and Franz Gebauer, Vienna, Austria, assignors to Semperit Aktiengesellschaft, Vienna, all of Austria

Continuation of Ser. No. 249,718, May 2, 1972, abandoned. This application May 22, 1974, Ser. No. 472,233
Claims priority, application Austria, May 5, 1971, 3928/71
Int. Cl.² B28B *7/32*
U.S. Cl. 249—65 **7 Claims**

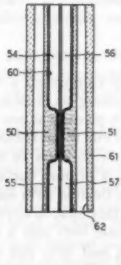


1. A re-usable hollow elongated casing formwork element of elastic material, adapted for placement into a concrete pipe line and adapted to be rendered pressure resistant by filling it with a gaseous or liquid fluid medium, comprising an elongated, elastic outer casing and at least two elongated elastic hollow cylinders positioned side-by-side within and extending over the entire length of said outer casing whereby at least two elongated communicating cavities are formed intermediate said outer casing and said cylinders and are adapted to be pressurized by said fluid medium, at least two of said hollow cylinders being interconnected by openings therebetween whereby said fluid medium can communicate between said two interconnected hollow cylinders, a first valve for introducing said fluid medium into one of said two hollow cylinders for pressurizing both said cylinders and a second valve for introducing said fluid medium into one of said hollow cavities for pressurizing both said cavities.

3,973,750
CASTING MOLD FOR DIRECTIONAL SOLIDIFICATION OF AN ALLOY

Maurice Rabinovitch, Chatillon, and Herve Bibring, Meudon, both of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France

Continuation of Ser. No. 403,383, Oct. 4, 1973, abandoned. This application July 7, 1975, Ser. No. 593,669
Claims priority, application France, Oct. 6, 1972, 72.35545
Int. Cl.² B22C *3/00*
U.S. Cl. 249—114 **4 Claims**



1. A mold for the directional solidification of a metal alloy composite to produce a refractory directionally solidified polyvariant fiber-reinforced composite having eutetic-type structure consisting essentially of two distinct independent phases constituted by:

a. a complex multicomponent matrix phase consisting essentially of:

i. at least one metal selected from the group consisting of Fe, Ni and Co, and

ii. chromium in an amount between 10 and 25 percent by weight of the composite;

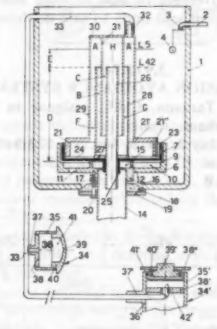
and in said matrix:

b. an in situ grown reinforcing phase free from chromium and consisting essentially of whisker-like elongated monocrystalline fibers of at least one metal monocarbide, the metal of which is selected from the group constituted by Ta, Nb, Hf and Ti, said mold comprising an elongated hollow body composed of a refractory material selected from the group which consists of graphite, tungsten, molybdenum, and tantalum, and a thermally blow-pipe applied coating of a refractory metal oxide coating the interior of said body in a uniform-thickness layer of a thickness of substantially 0.1 to 0.5 mm and of a porosity of at most 10%, said refractory metal oxide being selected from the group which consists of aluminum oxide, and having a purity of at least 99.5%, said body and said layer being dimensioned to permit a solidification rate of 0.5 to 6 cm/hour for alloys having a melting point of 1300°C to 1400°C and heated to a temperature of 1700°C to 1750°C.

3,973,751
SIPHON WITH PRESSURE PRIMING AND PNEUMATIC REFLUX

Maria Brugnoli, Via Torrevecchia 987, and Francesco Amici, Piazza Cavour 17, both of Rome, Italy

Filed Mar. 24, 1975, Ser. No. 561,036
Claims priority, application Italy, Apr. 12, 1974, 50386/74
Int. Cl.² F16K *31/126;* **E03D** *1/04*
U.S. Cl. 251—61.1 **4 Claims**

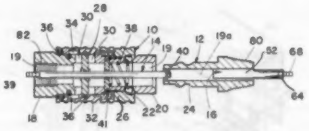


1. A liquid siphon comprising, a tank, an inner shell and an external shell disposed within the tank, each shell being open at one end and each provided with an inner cylinder, the shells and cylinders being arranged coaxially spaced with respect to each other so as to form a series of annular coaxial chambers, the end of the external shell being enlarged to form a bell part defining an interior portion thereof, a deformable gasket disposed about said bell part to close said interior portion, the bell part having an external wall opposite the interior portion and at least one passageway formed in said external wall to communicate the interior portion with the outside thereof, said passageway being closed by the gasket when the gasket is deformed by priming of the siphon with liquid and discharge of the liquid from the tank.

3,973,752
QUICK DISCONNECT COUPLING FOR COAXIAL FLUID LINES

Wallace G. Boelkins, Grand Rapids, Mich., assignor to Uni-Mist, Inc., Grand Rapids, Mich.

Continuation of Ser. No. 438,690, Feb. 1, 1974, abandoned, which is a division of Ser. No. 222,890, Feb. 2, 1972, Pat. No. 3,820,827. This application Oct. 20, 1975, Ser. No. 623,894
Int. Cl.² F16L *29/00, 37/28*
U.S. Cl. 251—149.6 **16 Claims**



1. A coupling member for making inline connections of the respective ends of both the inside and outside conduits in "coaxial" type telescoped fluid lines, comprising:

a mutually engageable first plug member and said socket member each having an end portion with means for attaching thereto the respective ends of one of said fluid conduit lines at an interruption therein and having a passageway therethrough for passage of a first fluid;

attachment means on said plug and said first socket for releasably connecting same together when mutually engaged;

a second plug member and a second socket member positioned in telescoping relation with respect to said first plug and said first socket member;

said second plug and said second socket each having an end portion with means for attaching thereto the respective ends of a different one of said fluid conduit lines at an interruption therein and having a passageway therethrough for passage of a second fluid, said second plug and socket having portions which cooperatively engage each other when said first plug and socket are connected;

means mounting portions, including at least the said end portions, of at least one of said first or second plug or socket members so as to be angularly movable about the longitudinal axis of the corresponding part of the coupling which is in telescoping relation with such plug or socket members; and

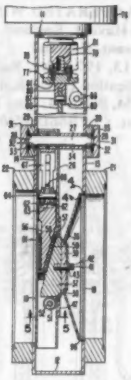
valve means in at least one of said first and said second plug and said first and said second socket to control flow of fluid in at least one of said first and said second passageways.

3,973,753
HIGH VACUUM GATE VALVE

William R. Wheeler, Saratoga, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Mar. 18, 1974, Ser. No. 452,110
Int. Cl.² F16K *3/04, 31/00*
U.S. Cl. 251—204 **27 Claims**

1. In a gate valve: a valve body having inlet and outlet openings, a swinging arm pivotally mounted in the valve body for movement transversely of the axis of one of the openings, a valve closure member carried by the swinging arm and positioned to be moved into and out of alignment with the one opening as the swinging arm is moved in the valve body, means for limiting the movement of the closure member in one direction to define a limiting position in which the closure member is aligned with the one opening, wedge means carried by the swinging arm and movable longitudinally thereof for moving the closure member axially of the one opening from a retracted position to an extended position for closing said one opening, resilient means carried by the swinging arm for urging the closure member toward its retracted position, and an actuating member movable between first and second positions for exerting a force on the wedge means to move the swinging arm in the one direction toward the limiting position and thereafter to move the wedge means longitudinally of the

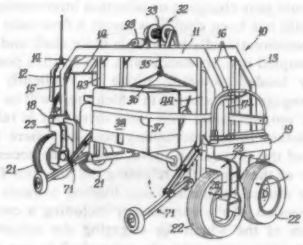


arm to move the closure member to its extended position and close the one opening, the resilient means holding the closure member in its retracted position and preventing movement of the wedge means longitudinally of the arm until the closure member reaches the limiting position.

3,973,754
TRANSFORMER CADDIE

William H. Chadwick, Jr., Rossville, Ga., assignor to Sherman & Reilly, Inc., Chattanooga, Tenn.

Filed Jan. 30, 1975, Ser. No. 545,301
Int. Cl.² B60P *1/02*
U.S. Cl. 254—139.1 **1 Claim**



1. A transformer caddie comprising: an inverted U-shaped frame having a horizontal top portion and front and rear vertical support means; transformer hoist means mounted substantially at the center of said top portion and being operable to suspend a transformer therebelow; a gasoline engine and a hydraulic pump driven thereby; front and rear pairs of adjacently disposed wheels; plural wheel mounting bracket means, each being rotatably connected to an associated said vertical support means to mount one of said wheels for revolution about a horizontal axis and for steering about a steering axis; and independently operable front and rear steering means for rotating said wheel mounting bracket means in said front and rear pairs, respectively; each of said front and rear steering means comprising a pair of hydraulic steering cylinders attached to an associated said vertical support means, a pair of steering arms, and linkage interconnecting said arms, each of said arms being connected to a said wheel mounting bracket means, and said cylinders having opposing pistons

hydraulically controlled by said pump and individually connected to said arms.

3,973,755

HAND OPERATED WINCH

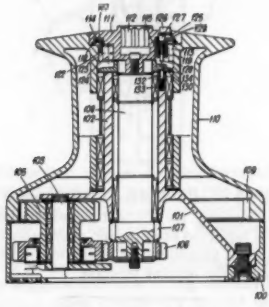
Derek James Fawcett, Havant, England, assignor to Lewmar Marine Limited, Havant, England

Filed Dec. 13, 1974, Ser. No. 532,601

Claims priority, application United Kingdom, Dec. 19, 1973, 58878/73; Feb. 26, 1974, 8687/74; May 10, 1974, 20876/74

Int. Cl.[2] B66D *1/30*

U.S. Cl. 254—150 R 16 Claims



1. A multi-speed winch having a plurality of drive ratios available between a central drive shaft and the winch drum, in which the drum is rotated always in one direction but with different drive ratios from the drive shaft when the drive shaft is successively rotated in successively opposite directions without manual gear changing or selection interventions once the initial ratio has been chosen wherein a first ratio drive is engageable unidirectionally between a drive shaft and a drum or held uncoupled in accordance with the relative position of a resiliently loaded actuator which is resiliently loaded towards an engagement position in which there will be engagement of the unidirectional first ratio drive but is releasably held by a detent in an uncoupling position where there is uncoupling of the first ration drive, and means accessible to the operator of the winch for releasing the actuator from the detent to be moved by the resilient loading towards the engagement position, the winch further including a catch on a static portion of the winch for engaging the actuator only when the actuator moves with the drive shaft in one absolute direction of rotation and is in engagement position and urging it relative to the shaft and against its resilient loading to its uncoupling position in which the first ratio drive is held uncoupled and it is held by the detent, in which uncoupling position the actuator becomes disengaged from the catch.

12. In a winch having more than two drive ratios between a central drive shaft and a winch drum, which are engageable successively opposite rotations of the drive shaft to drive the drum in a single direction and having means for automatically uncoupling a first speed ratio drive upon a first reversal of the drive shaft, including an actuator for causing the said uncoupling and movable to an uncoupling position and to an engagement position in which latter position the first speed ratio drive may be engaged, the improvement comprising means resiliently urging the said actuator towards its engagement position from its uncoupling position and means on a static part of the which effective upon rotation of the drive shaft in one direction only to urge the actuator to its uncoupling position against the continuous opposition of the resilient means.

3,973,756

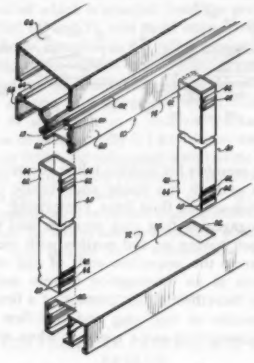
RAILING AND METHOD OF ASSEMBLY

Rene Lauzier, Ruy, France, assignor to Cegedur GP, Paris, France

Continuation-in-part of Ser. No. 220,033, Jan. 24, 1972, abandoned. This application Jan. 30, 1975, Ser. No. 545,586

Int. Cl.[2] B21F *27/00*

U.S. Cl. 256—21 13 Claims



1. In a railing device formed of a plurality of support bars and a pair of elongate rail members secured in spaced apart parallel relation by said support bars, the improvements wherein the rail members comprise elongate members having a base portion and side walls extending substantially perpendicularly from the lateral edges of the base portion with the side walls of one rail member extending in the direction away from the side walls of the other rail member so that the rail members define U-shaped members with oppositely facing concavities, a plurality of longitudinally spaced openings through the base portion dimensioned and shaped to correspond with the cross-sectional shape and dimension of the support bars to enable an end portion of a support bar to be projected therethrough, said rail members having at least two pairs of crosswise aligned ribs extending inwardly from the opposite side walls in substantially spaced parallel relation from the base portion, with the pair of crosswise aligned ribs at the first level adjacent the base portion having a cam surface extending from the innermost portion of the rib towards the side wall in the direction facing the base portion with the portion of said ribs facing away from the base portion extending sharply outwardly in the direction of the side walls, and grooves in the side walls of the end portion of the bars corresponding in number to the number of ribs in the side wall of the rail and in corresponding spaced relation, with the grooves being dimensioned to receive the ribs therein with the portion facing in the direction away from the adjacent end extending sharply inwardly from the side wall, the pair of ribs at the first level adjacent the base portion being spaced one from the other at their innermost portions by an amount less than the distance between the grooved side walls in the end portion of the bars whereby the cam surfaces are engaged by the end portion of a bar during endwise displacement through the opening into the space between the side walls for displacement of the side walls in the direction away from each other until the base portion clears the innermost portions of the pair of ribs at the first level and for return of the side walls to normal position with the ribs received within the grooves and with the portion of the ribs facing away from the base portion in face to face relation with the portion of the bars facing away from the ends when in the assembled relation.

3,973,757

SILO FOR MIXING AND HOMOGENIZING BULK MATERIAL

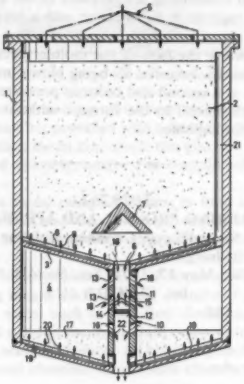
Hans Klein, Beckum; Horst Ritzmann, Enniger, and Peter Kremerskothen, Ennigerloh, all of Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Mar. 26, 1975, Ser. No. 562,061

Claims priority, application Germany, Apr. 10, 1974, 2417468

Int. Cl.² B01F *15/00*

U.S. Cl. 259—4 R **8 Claims**



1. A device for mixing and homogenizing bulk material comprising a silo chamber and a mixing chamber separated by an aeratable base overlying the mixing chamber, said mixing chamber having a volume less than that of said silo chamber; material inlet passage means communicating between said mixing chamber and said silo chamber; an aeratable base for said mixing chamber having an area corresponding substantially to that of the base of said silo chamber and through which fluidizing air may pass into said mixing chamber; and material outlet means communicating with said mixing chamber.

3,973,758

CONVEYING AND MIXING APPARATUS

William Nyitray, Chicago, and Robert L. Francke, Cary, both of Ill., assignors to Northwest Molded Products Corporation, Waukegan, Ill.

Filed Feb. 10, 1975, Ser. No. 548,594

Int. Cl.² B01F *7/08*

U.S. Cl. 259—6 **4 Claims**

1. A mixing and conveying apparatus for dry materials including:

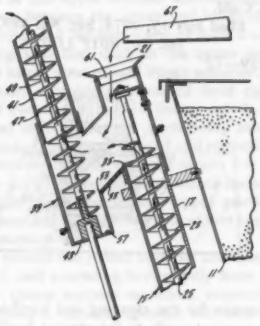
a first auger conveyor for transporting a first dry material with said conveyor extending in a generally upright direction and having its inlet near the lower end thereof and its outlet near the upper end thereof,

a second auger conveyor extending in a direction generally parallel to said first conveyor and having its inlet near the lower end thereof and its outlet near the upper end thereof with the inlet of said second conveyor being lower than the outlet of said first conveyor,

a downwardly extending chamber connecting the outlet of said first conveyor with the inlet of said second conveyor,

said first conveyor arranged to discharge said first dry material into said chamber through its outlet in an upwardly direction, and

an opening into said chamber for the introduction of at least one additional dry material with said opening located to permit said additional dry material to move in a downwardly direction into said chamber and to mix with said first dry material before said materials reach the inlet of



said second conveyor, said opening being located above the outlet of said first conveyor.

3,973,759

LIQUID-LIQUID MIXER

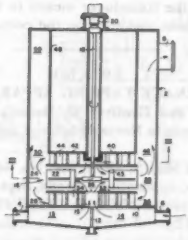
Joseph Mizrahi, and Eli Barnea, both of Haifa, Israel, assignors to IMI(TAMI) Institute for Research and Development, Haifa, Israel

Filed Nov. 21, 1974, Ser. No. 525,741

Claims priority, application Israel, Nov. 26, 1973, 43692; June 17, 1974, 45046

Int. Cl.² B01F *7/20*

U.S. Cl. 259—8 **20 Claims**

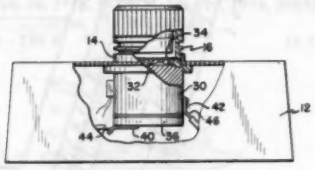


1. A liquid-liquid mixer comprising a cylindrical vessel with a vertical axis and at least one impeller within the vessel keyed on a coaxial vertical shaft connected to external driving means for imparting to the impeller a rotational movement, the diameter of the impeller being from about 50% to about 90% of that of the vessel, and associated with each impeller in spaced relationship thereto at least one coaxial recirculation chamber of a diameter which is essentially the same as that of the impeller and comprising two spaced circular plates of which the one closest to the associated impeller has a diameter substantially the same as the impeller and comprises a central hole, which plates are interconnected by a plurality of partitions extending from within in direction of the periphery, whereby a liquid-liquid dispersion arriving from the shearing zone of an impeller and flowing away from the periphery of the mixer is conducted into an associated recirculation chamber and from there back into the shearing zone.

3,973,760
ULTRASONIC CLEANING AND STERILIZING APPARATUS

Iben Browning, Albuquerque, N. Mex., and Robert E. McClure, El Cerrito, Calif., assignors to Robert E. McClure, El Cerrito, Calif.

Filed July 19, 1974, Ser. No. 489,964
Int. Cl.² B01F 11/02
U.S. Cl. 259—72 **13 Claims**



1. Apparatus for the cleaning and sterilization of contact lenses, particularly soft or fenestrated hard contact lenses, said apparatus comprising:

means for producing an oscillating current;

transducer means electrically connected to the oscillating current producing means, said transducer means producing mechanical oscillating motion responsive to the oscillating current;

a normally closed capsule adapted to contain a solution, the contact lenses being immersed in the solution in the capsule;

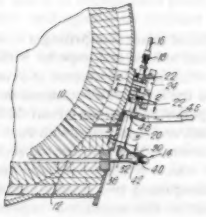
means for demountably attaching the capsule to the transducer means and simultaneously defining an enclosed volume between the transducer means and the lower surface of the capsule; and

a substantially incompressible, deformable coupling medium confined in and substantially completely filling the enclosed volume to provide a continuous spanwise mechanical coupling from the transducer means to the lower surface of the capsule to efficiently transmit ultrasonic waves from the transducer means to the solution in the capsule to clean and sterilize the contact lenses therein.

3,973,761
FURNACE TAPPING APPARATUS

Albert Pelletier, and Geoffrey D. Hallett, both of Noranda, Canada, assignors to Noranda Mines Limited, Ontario, Canada

Filed May 9, 1974, Ser. No. 468,524
Claims priority, application Canada, Sept. 27, 1973, 182037
Int. Cl.² C21B 7/12, 7/16
U.S. Cl. 266—272 **8 Claims**



1. An apparatus for stopping the flow of metal from the taphole of a furnace, the apparatus comprising:

a. a hollow pipe adapted to be inserted into said taphole, said pipe having a first portion which is rotatably mounted on said furnace and a second portion which is mounted for rotation about the axis of said first portion inwardly towards the furnace and into the taphole, said second portion having an outside diameter of sufficient dimension to seal the taphole;

b. means for mounting the first portion of said pipe to said furnace including a first platform which is secured to the wall of the furnace, a second horizontally adjustable platform mounted on said first platform and a third vertically adjustable platform mounted on said second platform, so as to precisely adjust the position of said second pipe portion with respect to the taphole;

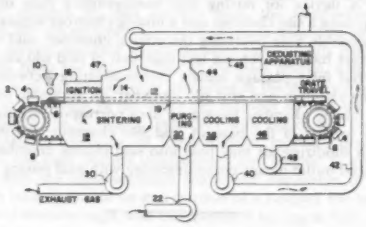
c. means for blowing air into said taphole through said pipe; and

d. means for controlling the pressure of the air being blown into said taphole in accordance with a pressure schedule in which the air is blown initially at a first pressure so as to just reverse the flow of the molten metal into the taphole without substantial air being blown into the furnace, and then at a second and reduced pressure just sufficient to hold the metal in the furnace without flow of metal through the taphole.

3,973,762
SINTERING PROCESS AND APPARATUS

Fred Cappel, Sprendlingen, Germany, assignor to Dravo Corporation, Pittsburgh, Pa.

Filed May 17, 1974, Ser. No. 470,914
Int. Cl.² C21B 1/18
U.S. Cl. 266—135 **7 Claims**



1. In an apparatus for continuous sintering and cooling of material on a travelling grate having an ignition zone, a downdraft sintering zone extending from said ignition zone to the burn-through point of the material, an initial cooling zone having a first area and means for forcing air through the material in the initial cooling zone at a first flow rate, a final cooling zone and means for forcing air through the material in the final cooling zone, and means for collecting the air from the initial cooling zone after passage through the material and forcing said air downwardly through the material in the downdraft sintering zone, the improvement comprising:

a. a purging zone having a second area one tenth to one half the area of the first area of the initial cooling zone;

b. means for forcing air from an external source upwardly through the material in the purging zone at a second flow rate of 2 to 10 times the first flow rate in the initial cooling zone sufficient to cause agitation of the dust in the material and greatly increase the removal of dust therefrom; and

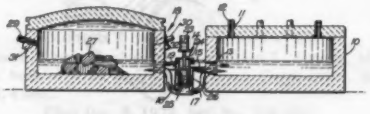
c. means for de-dusting the air after passage through the purging zone.

3,973,763

SYSTEM FOR MELTING METAL

Theodore D. Steinke, Pleasanton, and Melvin A. Carter, Livermore, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Division of Ser. No. 445,721, Feb. 25, 1974, Pat. No. 3,935,003. This application July 31, 1975, Ser. No. 600,546
Int. Cl.² C22B 7/00
U.S. Cl. 266—233 3 Claims



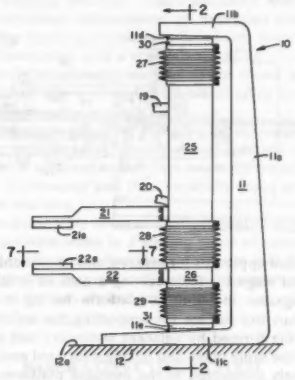
1. A system for melting metal comprising in combination
a. a first chamber provided with a heating means adapted to heat molten metal contained therein;
b. a second chamber adapted to contain solid metal to be melted;
c. a molten metal pumping means in fluid communication with said first and second chambers and adapted to pump molten metal from said first chamber to said second chamber;
d. a first conduit means in fluid communication with said pumping means and said first chamber for recirculating pumped metal back to said first chamber; and
e. a second conduit means in fluid communication with said first and second chamber for returning molten metal from said second chamber to said first chamber.

3,973,764

CLAMPING APPARATUS

Carl R. Holzer, Jr., Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Aug. 8, 1975, Ser. No. 602,926
Int. Cl.² B23Q 3/00
U.S. Cl. 269—26 6 Claims



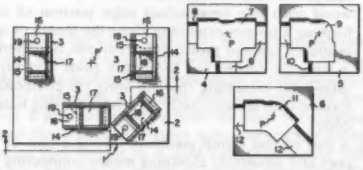
1. Apparatus for clamping a length of a brittle material for severing thereof into shorter lengths, such apparatus comprising, in combination;
I. a support frame having a vertical main portion and upper and lower portions extending generally horizontally from such main portion;
II. first and second spaced apart guide shafts extending vertically between said upper and lower portions of said support frame and connected therewith, such shafts being also spaced from said main portion of such frame;
III. similar upper and lower substantially C-shaped clamp support members each having a generally horizontally extending lower arm slidably surrounding both of said guide shafts and a shorter generally horizontally extending upper arm slidably surrounding said first shaft, the lower arm of said upper member surrounding said shafts in the space between the upper and lower arms of said lower member and the upper arm of such lower member surrounding said first shaft in the space between the upper and lower arms of said upper member;
IV. a vertically disposed pressurized fluid cylinder and associated piston rod, such cylinder and the otherwise free end of such piston rod each being attached to a different one of said lower arms of said support members;
V. longitudinal tensionally resilient means for supporting said upper support member, such means having first and second ends connected to said upper portion of said support frame and to said lower arm of said upper support member, respectively;
VI. first and second bifurcated material clamping members attached to and extending horizontally from said upper and lower clamp support members, respectively, such members being in vertical alignment with each other; and
VII. conduit means for selectively supplying pressurized fluid to the upper and lower ends of said cylinder to actuate said clamp support members and, thereby, said clamping members away from and toward each other for receipt and clamping therebetween, respectively, of said length of material, whereby a severing blade moved downwardly between the bifurcations of said clamping members cuts said length of material without chipping thereof towards the finish of the cut.

3,973,765

PIPEFITTER'S JIG

John B. Babcock, P.O. Box 167, Minooka, Ill. 60447

Continuation of Ser. No. 419,692, Nov. 28, 1973, abandoned. This application June 2, 1975, Ser. No. 583,137
Int. Cl.² B23Q 3/00
U.S. Cl. 269—37 3 Claims



1. Apparatus for facilitating the coupling of a length of pipe in telescoping relation to a pipe fitting having at one end thereof an open mouth for the accommodation of a predetermined length of said pipe, said fitting having an internal shoulder spaced a predetermined distance inwardly from its open mouth and against which said length of pipe may seat, said apparatus comprising a base establishing a reference point; means carried by said base for supporting said fitting with said one end thereof fixed at a predetermined distance from said reference point; guide means for supporting said pipe in an initial position with one end thereof accommodated in said one end of said fitting and seated on said shoulder; means for fixing said pipe on said guide means when said pipe is in said initial position; means mounting said guide means on said base for free sliding movement in a direction away from said fitting supporting means whereby said one end of said pipe may be moved from said initial position outwardly of said fitting and out of engagement with said shoulder; and a stop member carried by said base at a second and greater predetermined distance from said reference point, said stop member being located in a path of movement of said guide means in said direction and being engageable by said guide means, said stop

member being so positioned on said base that the maximum distance said guide means may move in said direction is less than the distance from said shoulder to said open mouth of said fitting.

3,973,766

MODEL AIRCRAFT WING CONSTRUCTION JIG

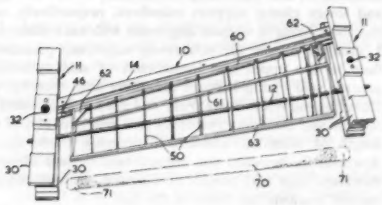
Vernon Ernest Heath, 28 Springfield Road, Walmley, Sutton Coldfield, West Midlands, England

Filed June 24, 1975, Ser. No. 589,823

Claims priority, application United Kingdom, Mar. 27, 1975, 13124/75

Int. Cl.² B23P *19/04*

U.S. Cl. 269—43 6 Claims



1. A model aircraft wing construction jig comprising:

a. an elongate front assembly rail having a pair of longitudinally-extending jaws and means for clampingly adjusting said jaws so as, in use, to hold therebetween a flat strip of wood with one longitudinal edge portion of said strip forming a tongue extending along the length of said front assembly rail and protruding from one side thereof;

b. a wing rib carrier rod forming a guide and support for threadably mounting thereon wing rib components preformed with an accurately located mounting hole in their body;

c. a pair of end clamp members having a pair of opposed jaws and adjustable clamping means connecting together said jaws;

d. the end clamp members being adapted to engage and hold between their said jaws respective end portions of said front assembly rail and of said wing rib carrier rod so as to form an assembled jig structure in which the front assembly rail and wing rib carrier rod are disposed in spaced-apart relationship both extending, in directions mutually co-planar, between the end clamp members which are controllable, by said adjustable clamping means, to enable said end portions to be held in different positions so as to permit the relative angular relationship between the front assembly rail and wing rib carrier rod in the made-up jig structure to be varied and set to conform to the required wing shape, whereby in use in building a wing, the rib components thereof, preformed with the accurately located hole in their body and formed also with a notch in their leading end edges, can be moved, after threadably mounting on said rib carrier rod and after assembling and setting the jig structure, into their correct relative positions wherein they are located by engagement of the notch in their leading edges with the protruding tongue of the flat wood strip held by the front assembly rail.

3,973,767

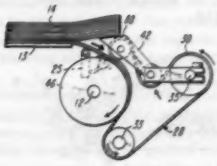
METHOD AND APPARATUS FOR FEEDING SHEET MATERIAL

Lawrence I. Kramer, 532 Cherry Drive, Dayton, Ohio 45405

Filed Nov. 18, 1974, Ser. No. 524,530

Int. Cl.² B65H *3/08, 5/02, 5/06*

U.S. Cl. 271—12 11 Claims



3. Apparatus for successively feeding flexible sheet-like articles from a supply stack, comprising means for supporting the supply stack of articles, a rotatable wheel spaced from the lowermost article in the stack, an endless belt positioned adjacent said wheel and having a portion thereof extending at least partially around the periphery of said wheel, means for driving said belt and said wheel, means for positioning an end portion of the lowermost article in the stack adjacent said wheel, means for shifting said belt circumferentially around the periphery of said wheel between a non-gripping position spaced from said article and a gripping position overlapping said article, and said shifting means being effective to cause said belt to move toward said article and thereby frictionally engage said article between said belt and said wheel for pulling and feeding said article from the stack.

3,973,768

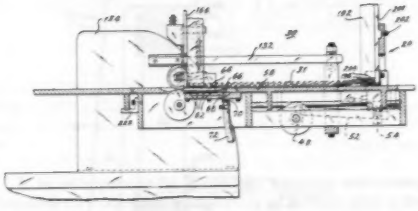
DETACHABLE FEED MECHANISM FOR PRINTING DEVICES AND THE LIKE

Richard E. Shannon, 355 Albert Drive, Florissant, Mo. 63031

Filed Nov. 22, 1974, Ser. No. 526,125

Int. Cl.² B65H *3/12*

U.S. Cl. 271—99 19 Claims



1. A feed apparatus for printing and like machines comprising a feed magazine for receiving a stack of articles to be fed, said magazine including a platform having a substantially continuous top surface for supporting the articles, said platform being formed by adjacent stationary and movable portions in the same plane and having a forward end, drive means operatively connected to the movable platform portion at a location thereon spaced rearwardly from the forward end, said drive means including means to reciprocate said movable platform portion in the plane thereof, spaced means extending upwardly from positions adjacent to the platform to maintain articles to be fed in a stacked condition thereon, means forming a throat centrally located adjacent to the forward end of the platform through which the lowermost article in the stack can be fed, said throat extending at least in part below the article supporting platform, means centrally located adjacent to the forward end of the movable portion of the platform forming a cavity in the surface thereof adjacent to the throat

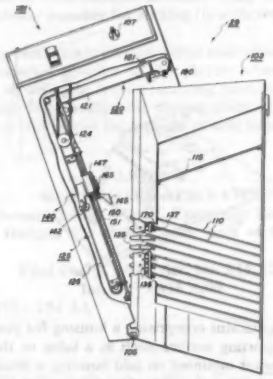
forming means, a source of subatmospheric pressure and means periodically communicating said cavity with said source including conduit and valve means, said valve means having a pair of relatively movable valve members with cooperating valve chambers formed therein, one of said pair of valve members having an operative connection to the drive means for movement thereby whereby the cooperating valve chambers periodically establish communication between the subatmospheric pressure source and the cavity in the movable platform portion.

3,973,769

COMPACT SORTING APPARATUS

Thomas R. Cross, Rochester, and Clifford L. George, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 9, 1974, Ser. No. 530,908
Int. Cl.² B65H 31/24
U.S. Cl. 271—173 4 Claims



1. In a copying machine which produces multiple copy sheets of document information, an improved sheet sorting apparatus for stacking copies in collated sets comprising:

a frame associated with a copying machine;

a first modular assembly secured to the frame including a plurality of bins arranged in a vertical array for receiving copy sheets,

a second modular assembly including sheet transport means having substantially horizontal and vertical conveyors positioned adjacent to said first assembly for transporting sheets horizontally and then vertically along the inlets of each of the bins,

said second assembly being pivotally mounted to move from a first position when in a sorting mode of operation to a second position in a direction away from said first assembly to provide access to said sheet transport means and bin inlets for jam clearance thereof.

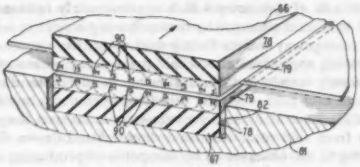
3,973,770

PAPER CONVEYING SYSTEM

Stephen Montenbruck, 7774 Elm Grove Drive, Elmwood Park, Ill. 60635

Filed Apr. 16, 1975, Ser. No. 568,596
Int. Cl.² B65H 5/02, 29/12
U.S. Cl. 271—272 9 Claims

2. A device for conveying sheets of non-magnetic material which comprises a pair of opposed moveable surfaces of small particle size ferrous permanent magnetic material contactable with one another, the surfaces moving at a plane of contact in the same direction, each of said surfaces comprising a plurality of magnetic fields exhibiting a plurality of sets of of continuous parallel lines of N and S polarity extending in a direction of movement of the surfaces across the widths of the surfaces at the plane of contact, the lines of polarity alternating a plurality of spaced N and S parallel poles across the surfaces transversely of the direction of movement of the surfaces at



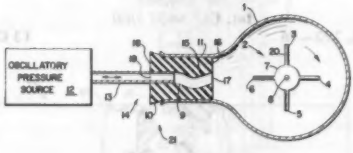
the plane of contact, and the polarity of the individual lines of polarity of one surface opposed to opposite polarity lines of polarity of another of the surfaces whereby the surfaces are magnetically attracted to one another in parallel relation along said plane of contact and will grip a sheet of non-magnetic material therebetween for movement with the surfaces.

3,973,771

ILLUSION AMUSEMENT DEVICE

Mark Schuman, 101 G St., SW. Apt. No. 516, Washington, D.C. 20024

Continuation-in-part of Ser. No. 408,288, Oct. 23, 1973, Pat. No. 3,902,263. This application Sept. 3, 1974, Ser. No. 502,748
Int. Cl.² A63J 23/00
U.S. Cl. 272—8 R 47 Claims



1. A turbine apparatus driven by a source of substantially oscillatory fluid pressure variation comprising a turbine including a rotor mounted to rotate about a rotor axis, a blade affixed to said rotor at a finite distance from said axis for receiving a pressure impulse from the fluid for rotating the rotor and blade about the rotor axis, passageway means for connecting said turbine in a fluid flow relationship with the source, said passageway means alternately conducting fluid in a direction from the source toward the turbine during a first portion of the oscillatory cycle while the pressure of the source exceeds the pressure of the fluid proximate the turbine and from proximate the turbine toward the source during a second portion of the cycle while the source pressure is less than the fluid pressure proximate the turbine, said passageway means being positioned and oriented so as to direct said conducted fluid from said passageway means in a stream toward a face of said blade during said first portion of the cycle so as to produce a positive pressure impulse on the blade upon deflection of the directed fluid by the face, said positive impulse producing a positive torque on said rotor and said turbine for driving the turbine in a positive direction of rotation about said axis, said conducted fluid during said second portion of the cycle being drawn substantially in a diffuse current from proximate the turbine into the passageway means, said diffuse fluid current producing a negative pressure impulse on the turbine, said negative pressure impulse being substantially weaker than said positive impulse, whereby a net positive torque on the turbine is derived from said alternate conduction of fluid, said net positive torque tending to drive the turbine in said positive rotational direction; wherein the tur-

bine includes a multiplicity of blades functioning similarly to, and including, the first named blade, said blades being disposed approximately radially with respect to the axis of said rotor, said positive torque being augmented and made more uniform during the cycle of rotation as a result of said multiplicity of blades; wherein said passageway means has an apparent axis of symmetry which approximately intersects said rotor axis, said passageway means having a port in a face of said passageway means facing said rotor, the center of said port being approximately on said passageway means axis, said alternately conducted fluid flowing in alternate directions through said port, whereby said fluid appears to an observer to be directed along said passageway means axis toward and away from said rotor axis, said directed and drawn fluid appearing to the observer to be incapable of producing said net positive torque on the turbine; said passageway means having a passageway for alternately conducting said directed and said drawn fluid through said port, said passageway having a passageway portion proximate said port, said passageway portion being at least partially hidden from view by the observer by said passageway means, said passageway portion having a mean flow axis at a substantial angle with said apparent passageway means axis for directing said fluid toward said blade face at a finite distance from said rotor axis for providing said net positive torque so as to produce and sustain said positive rotation of said turbine in spite of said apparent incapability.

3,973,772

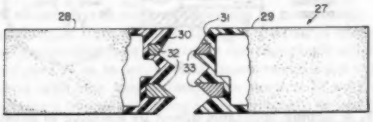
TOY KARATE DEVICE

Paul E. Milliken, 9061 Wall St., NW., Massillon, Ohio 44646

Division of Ser. No. 390,866, Aug. 23, 1973, Pat. No. 3,883,135, which is a continuation-in-part of Ser. No. 359,099, May 10, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,589

Int. Cl.[2] A63J *5/00*

U.S. Cl. 272—76 **13 Claims**



1. A toy karate device which can be reassembled repeatedly and rebroken to simulate the breaking of a solid continuous board with a human hand comprising:

A. a separable elongated horizontal member comprising a pair of mating pieces joined together in end to end relationship, each piece having an irregular edge which interfits with a similar irregular edge on the opposite piece, each of the irregular edges comprising a series of longitudinally extending outwardly converging projections alternately defining therebetween inwardly converging depressions, the projections of one piece extending into the depressions of the opposite piece when the pieces are assembled together, in such manner that the projections of one piece overlap the projections of the other piece in the longitudinal direction, the configuration of both irregular edges creating the visual appearance of the broken edges of an object that has been broken in two, when the two pieces are disassembled;

B. means supporting opposite ends of the separable member a spaced distance from a fixed surface;

C. first cooperative means attached to the irregular edge of one piece; and

D. second cooperative means attached to the irregular edge of the other piece;

E. said first and second cooperative means being of such construction that when placed in contact with each other they remain together and releasably attach the two mating pieces together;

F. said cooperative means being separable from each other when the separable member formed from the assembled mating pieces is struck a sharp blow;

G. each of said cooperative means having an outwardly facing surface which follows the contour of the adjacent portions of the irregular edge of the piece to which it is attached and of adjacent portions of the outwardly facing surface of the cooperative means attached to the opposite piece.

3,973,773

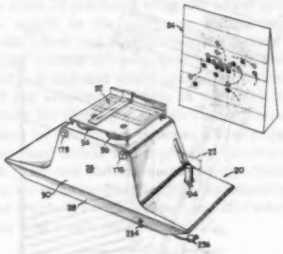
GAME APPARATUS

Marvin I. Glass, Chicago; Gordon A. Barlow, Skokie, and Gunars Licitis, Lombard, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 24, 1972, Ser. No. 220,314

Int. Cl.[2] A63F *9/00*

U.S. Cl. 273—94 R **8 Claims**



7. Game apparatus comprising a housing for positioning on top of a supporting surface such as a table or the like, film projecting means mounted on said housing, a plurality of film strips each bearing a plurality of transparencies each illustrating a game situation, said film transparencies including diagrams of football plays, with one set of transparencies illustrating positions and movements of defensive players and the other set of transparencies illustrating positions and movements of offensive players, the transparencies of each strip being arranged in series with each transparency on each strip providing one frame of a coordinated sequential series of play-by-play frames on each strip, means on said housing for receiving and supporting said strips simultaneously for viewing a game situation as illustrated by an image from one of the transparencies of one of the strips superimposed for viewing on an image from a transparency on a second strip to thereby illustrate a game situation represented by the two superimposed images, means on said housing separately operable for each of said strips to move each of said strips individually to present the individual images thereon in superimposed registry, and separate actuating means for each of said operable moving means for operation by individual players of the game to provide increment advancement of the strips by an individual player to change the game situation depicted by the superimposed images.

3,973,774

PROJECTING CATAPULTS AND VIEW OBSTRUCTING CYLINDER

Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Mar Glass & Associates, Chicago, Ill.

Filed Oct. 2, 1975, Ser. No. 618,947

Int. Cl.[2] A63B *71/02*

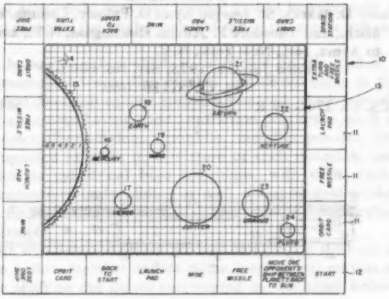
U.S. Cl. 273—95 R **8 Claims**

1. A game device comprising:

a base;
an upright open-top tubular member mounted on said base;
a plurality of catapult levers pivotally mounted on said base, each catapult lever including an impact receiving portion and a playing piece striking portion, the playing piece striking portion of each catapult lever being located within said tubular member and the impact receiving

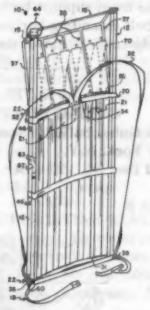
portion of each catapult assembly being located outside the tubular member for striking by a player of the game; and
a playing piece freely located within said tubular member in an unknown position to the players whereby a player seeks to strike the impact receiving portion of the proper catapult lever so that the playing piece striking portion thereof will propel the ball out of said tubular member.

3,973,775
GAME BOARD APPARATUS
William Bernard Bolan, 846 W. Centerville Road, and Steve Wayne Hodges, 937 Patio Court, both of Garland, Tex. 75041
Filed Oct. 2, 1974, Ser. No. 511,225
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AA **9 Claims**



1. A game apparatus comprising:
an outer game board having a plurality or means dividing the periphery thereof into a plurality of playing positions to accommodate player marker means;
indicia within each of said playing positions to convey instructions to players to take actions in accordance with preselected game rules;
an inner game board having at least three territorial indicia spaced apart and disposed on the surface of said inner game board and means dividing the surface of said inner game board into a grid comprised of a plurality of grid segments to accommodate player token means, said inner game board being adapted to be disposed within said outer game board with said plurality of playing positions of said outer game board extending around the outer edges of said inner game board;
at least two player marker means for movement around the periphery of said outer game board in accordance with preselected game rules, each of said player marker means being identifiable from the other of said player marker means;
a plurality of player token means for placement and movement within said grid segments of said inner game board in accordance with preselected game rules;
a plurality of instruction cards having indicia on one side thereof to instruct players to take certain actions in accordance with preselected game rules;
a chance means having a plurality of indicia thereon to determine movement of said player market means and said player token means;
a signal generator means to generate a random signal responsive to action by two separate players;
at least one instruction means having indicia thereon to instruct players to make movement and placement of said token means responsive to said random signal generated by said signal generator means.

3,973,776
ARROW QUIVER AND PACK FRAME
Terry Richard Ogle, 9504 Candywood Lane, Louisville, Ky. 40291
Filed June 19, 1974, Ser. No. 480,966
Int. Cl.² A45F *3/10, 4/00*
U.S. Cl. 224—1 B **4 Claims**



1. What I claim as new, is a support assembly for arrows made up of two similar sections, one behind the other, separated by a rubber gasket, in which each section consists of a pair of upstanding main support tubes pointed at base end and joined equally by a number of horizontal, semicircular crossbraces; the top crossbrace (rectangular in shape) is mounted on the uppermost portion of the main support tubes; the front portion consists of a straight, horizontal crossbrace piece and the rear portion (being squared off instead of semicircular) consists of a U shaped brace extending rearwardly the same distance as the semicircular crossbrace, and angling downward a slight degree to be parallel with the ground when the support assembly is in the open position; lateral padeyes are attached to outboard rear support tubes in order to lash loads to the frame; the two similar sections are joined together at the uppermost limit by a superior hinge, permitting the front section to rotate about the rear section, so that the open position resembles an "A" frame; the spread of the frame is defined by placing the farther distant holes on the "L"-shaped brace over the threaded studs protruding from the outboard midpoint of each main support tube and screwing it down by wingnuts; upon removal of "L"-shaped brace assembly, the quiver can be moved to the closed position and said brace can then be replaced over the same threaded studs, using the smaller distant holes and screwed down by wingnuts, so that the support assembly resembles a packframe in the closed position; a series of vertical support rods descend from the rear portion of the superior rectangle to the lowest in line

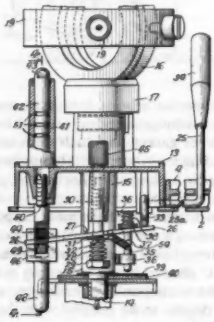
crossbrace; the two outboard vertical support rods, attached to the outboard corners of the superior rectangle, terminate at the junction of the first in line crossbrace and main support tube; arrows are protected by an outward camouflage cloth covering, on the exterior portion of the front and back sections with each separate piece of cloth being fastened tightly and completely about the full perimeter of the frame, forming a taut surface on the front, which contacts the carrier's back, and a strong support surface on the rear to support the weight of the camp pack; the front section cloth cover continues loosely upward to form a waterproof, reinforced top flap, sealing off the upper portion of the superior rectangle so that when the quiver is in the open or closed position, the arrows are not at all visable; but, when the top flap is open, the arrow will pass unrestricted downward through the superior rectangle into the upper recess of the support assembly and into one of a plurality of upstanding arrow tubes below with furlined receptacle, penetrating between opposing crossbraces; the said arrow is supported in the upright position with the point resting on the arrow tube plug, sealing off the bottom portion of the tube; the upper portion of the plug is a soft material and the lower portion is a hard substance; each arrow tube is attached to the semicircular crossbrace of the front frame section only, and the upper recess freely houses the arrow fletching of various length arrows; a flexible two-strap shoulder harness attaches at midpoint on the uppermost front semicircular crossbrace and passing forward through the front cloth cover hole to attach at the corresponding right and left lower base of the main support tubes; also attached at these points is a waistbelt extending horizontally across the waist of the hunter to help support quiver on his back.

3,973,777

CUEING CONTROL

Dwipendra Nath Guha, Suffolk County, N.Y., assignor to Avnet, Inc., New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,565
Int. Cl.² G11B 3/10
U.S. Cl. 274—23 R **2 Claims**



1. In a cueing control for lifting the tone arm of a record player, the combination of a horizontal base plate; a turntable journaled on a vertical axis on said base plate; a vertical tone arm supporting shaft; a tone arm base providing a bearing on a vertical axis for the tone arm supporting shaft, said tone arm base being mounted on said base plate; a pair of interconnected gimbal rings comprising a vertical first gimbal ring mounted at its periphery diametrically in alignment with and on the top of said vertical tone arm supporting shaft to provide angular motion of the tone arm in a generally horizontal plane, and a horizontal second gimbal ring pivotally mounted on two horizontally aligned pivots carried by the first gimbal ring to provide angular motion for the tone arm in a generally vertical plane; a tone arm comprising a tube and having a pickup mounted at one end, the other end of the arm being mounted on and extending diametrically through the walls of the horizontal gimbal ring and extending through the vertical gimbal ring; a hydraulic governor comprising a vertical cylinder mounted on said tone arm base and having a vertical lifting plunger movably disposed therein below and in alignment with the downwardly facing horizontal annular wall of the horizontal gimbal ring; said plunger being movable into engagement with said horizontal gimbal ring to lift said tone arm and said pickup at any angular position of said tone arm, said plunger having annular rings containing a viscous grease to hydraulically control the rate of motion of said plunger within said cylinder to regulate the lifting rate of said tone arm; a fulcrum member extending downwardly from the base plate; a rocker plate disposed beneath said base plate and in contact, intermediate its ends, with said fulcrum member, one end of said rocker plate being connected to said plunger; a manually operable, self-locking cam having an operating finger piece, said cam engaging the other end of said rocker plate; a manually adjustable spring for applying a controlled pressure to the rocker plate on the side of the fulcrum which is engageable by the manually operable cam to bias said rocker plate against said cam, said cam being movable in one direction to pivot said rocker plate to raise said plunger and movable in the other direction to pivot said rocker plate to lower said plunger, whereby said tone arm may be lifted and lowered; and brake means comprising a holding pin connected to and operable in response to actuation of said rocker plate to move vertically into engagement with a friction plate connected to said vertical tone arm shaft, said holding pin being so located as to contact said friction plate just before said plunger engages said horizontal gimbal ring so as to brake said vertical tone arm shaft to prevent motion of said tone arm in a horizontal direction.

3,973,778

ENCLOSED BELT DRIVE FOR RECORD PLAYER TURNTABLE

Larry D. Marks, St. Joseph; Lynn D. Palmer, Coloma, both of Mich., and Theodore F. Jensen, Huntington, N.Y., assignors to Avnet, Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,639
Int. Cl.² G11B 3/60
U.S. Cl. 274—39 R **4 Claims**

1. In combination a base plate, a tubular center post mounted vertically upon said base plate, a driving motor mounted on and below the base plate with its shaft extending vertically above the base plate, a pulley mounted on the motor shaft above the base plate, a turntable having a central hub embracing and being rotatable upon said post, said turntable having a belt receiving drum affixed to its lower side coaxial with said hub, said turntable having a temporary belt holding pin on its lower side, said pin extending axially parallel to the axis of the drum and being adapted to hold a loop of the belt radially beyond the aforesaid pulley, said pin being attached at its upper end to the underside of the turntable at a radius substantially beyond the radius of the aforesaid motor pulley, wherein when said turntable is assembled the pulley is placed inside the loop formed by said belt, around said pin and drum, such that said belt will be released from said pin by rotation of said turntable and will contract into engagement with said pulley.

3,973,779

SEALING ARRANGEMENT

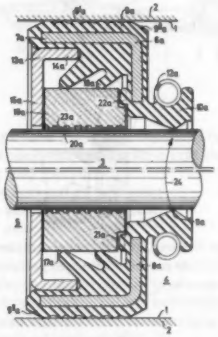
Feodor Burgmann, Assenhausen; Klaus Safft, Wolfratshausen; Hans Forch, Birkenau, and Gerd Upper, Gorxheimertal, all of Germany, assignors to Firma Feodor Burgmann Dichtungswerk, Wolfratshausen and Firma Carl Freudenberg, Weinheim, both of, Germany, part interest to each

Filed June 13, 1974, Ser. No. 478,845

Claims priority, application Austria, June 22, 1973, 5520/73

Int. Cl.² F16J *15/16, 15/54*

U.S. Cl. 277—25 **28 Claims**



1. Shaft seal assembly comprising an elastic annular seal, biassing means which hold the seal in sealing engagement but allow the seal to break away at a preselected increase of shaft speeds to allow leakage along a leakage path downstream of the seal and a fluid conveyor located in said leakage path to contact escaping fluid to be sealed ahead of the elastic annular seal,

a. a hollow member which is supported on the wall in a nonrotationable sealing manner and displaceable in the radial direction against spring action and which is made of a material having good antifriction properties, such as polytetrafluorethylene, graphite, metallic powder, impregnated asbestos or a mixture of such materials, and with its cylindrical bore surrounds, with slight radial clearance or under sliding contact, a longitudinal section of the shaft or a sleeve fastened to the latter in a sealing manner,

b. with tread-shaped return grooves being cut in the bore of the hollow member and/or in the longitudinal section of the shaft or the sleeve surrounded by the latter hollow member,

c. means defining thread form grooves cut in the bore of the hollow member and/or in the longitudinal section of the shaft or the sleeve surrounded by the latter hollow member to define said conveyor and being constructed and arranged to return escaping liquid to said housing.

3,973,780

SEAL MOUNTING ARRANGEMENT

Hanns Hornschuch, Easton, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation of Ser. No. 535,799, Dec. 23, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,938

Int. Cl.² F16J *15/34*

U.S. Cl. 277—81 R **7 Claims**

1. A seal mounting arrangement, for a rotary seal, comprising:

a seal rotary mounting; and

a rotary seal; wherein

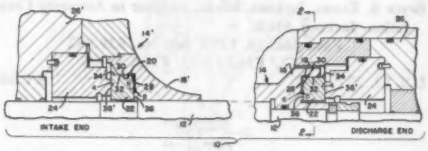
said seal is substantially circular, having a radial center, an external periphery, parallel end surfaces, and a central, axial bore;

said periphery and bore define first and second substantially concentric surfaces of said seal, and at least one of said surfaces has first and second radii, defining said one surface with an eccentricity;

said mounting has surfaces for receiving and engaging said seal;

said mounting and seal are slidably engaged;

said mounting having at least one surface which, upon rotation of said mounting, effects a contacting engagement with said one surface of said seal;



said one surface of said mounting is spaced from said radial center of said seal a distance which is intermediate those of said first and second radii;

said one surface of said mounting and said one surface of said seal define therebetween at least one arcuate, throughgoing void which communicates with both of said end surfaces; and

a fixed, non-rotating and axially non-yielding seal in abutting engagement with said rotary seal; wherein

said fixed seal has a planar surface which fully thereacross forms a face seal with one of said end surfaces of said rotary seal; and further including

means interposed between said mounting and said rotary seal for sealing the other of said end surfaces of said rotary seal.

3,973,781

SELF-LUBRICATING SEAL

Kurt Grörich, Berlin-Weissensee, Germany, assignor to VEB Gummikombinat Berlin, Berlin-Weissensee, Germany

Filed May 21, 1973, Ser. No. 361,995

Claims priority, application Germany, May 23, 1972, 163142

Int. Cl.² F16C *33/72;* **F16J** *15/44, 15/54;* **F16C** *31/00*

U.S. Cl. 277—134 **5 Claims**

1. An assembly comprising a pair of relatively slidable members having juxtaposed surfaces, one of said surfaces being substantially smooth and the other of said surfaces being formed with an array of closely spaced geometrically similar projecting frustopyramids converging toward said one of said surfaces, said frustopyramids each having a relatively large rhombis base proximal to said other surface and a relatively small rhombic base geometrically similar to the respective large rhombic base and turned toward said one of said surfaces and diagonals parallel to the corresponding diagonals of

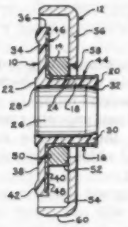
the small rhombic bases of the other frustopyramids, each frustopyramid having a first edge perpendicular to its small base and a diagonally opposite second edge including an obtuse angle with its small base whereby said edges lie in a common plane perpendicular to the plane of the respective small base and intersecting same along its small diagonal, the first and second edges of all said frustopyramids being turned toward opposite sides of said other of said surfaces, said projecting frustopyramids lying at least two rows with the frustopyramids of the two rows being mutually staggered.

3,973,782

ECCENTRICITY COMPENSATING SEAL

Bryce B. Evans, Jackson, Mich., assignor to Aeroquip Corporation, Jackson, Mich.

Filed Jan. 10, 1975, Ser. No. 539,962
Int. Cl.² F16J *15/32*; **F16K** *41/00*
U.S. Cl. 277—142 **3 Claims**



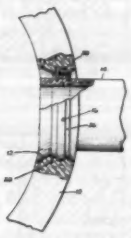
1. In combination, a cylindrical shaft, a member including an opening receiving said shaft, said opening being intersected by a sealing surface defined on said member perpendicularly disposed to the shaft length, a seal body having an annular configuration and including an opening of a diameter to receive said shaft, said body including an annular axially extending hub portion concentric to and defining said body opening and having an end and an annular flange portion radially extending outwardly from said axially extending hub portion having radially disposed sealing surface and spring engaging side surfaces and an outer periphery, said portions being in sealed fluid-tight relationship to each other and formed of resilient wear-resistant material, an annular continuous lip defined on said axially extending hub portion adjacent said end and extending radially inwardly and defining a circumferential portion of said body opening, said lip having a minimum inner diameter less than the diameter of said shaft whereby placing said seal body on said shaft deforms said lip and axially extending hub portion radially outwardly, a continuous annular ridge defined on said flange portion sealing surface engaging side surface projecting axially therefrom and radially spaced from said axially extending hub portion, an annular spring mounted upon said seal body, said spring including a plurality of axially extending cantilevered resilient elements disposed about and engaging the circumference of said axially extending hub portion and a plurality of radially extending cantilevered resilient elements engaging said spring engaging side surface of said flange portion whereby said resilient elements deform under the deformaton of said lip and flange, respectively, a substantially rigid annular ring circumscribing said spring and said hub portion engaging said axially and radially extending cantilevered resilient elements adjacent the intersection of said hub portion and said flange portion, said ring having an axial length less than that of said hub portion and a radial dimension less than that of said flange portion whereby said resilient elements may freely deform adjacent said lip and ridge, and an annular retainer circumscribing said hub portion mounted upon said member having a ring-engaging surface in spaced parallel relationship to said member sealing surface engaging said ring and maintaining said ring in engagement with said resilient elements and so spaced from said sealing surface as to maintain said ridge in a sealed relationship with said sealing surface.

3,973,783

PIPE JOINT SEALING DEVICE

Harry W. Skinner, and Max D. Orn, both of Fort Wayne, Ind., assignors to Harry W. Skinner, Fort Wayne, Ind.

Division of Ser. No. 197,656, Nov. 11, 1971, Pat. No. 3,874,063. This application Mar. 4, 1975, Ser. No. 555,111
Int. Cl.² F16J *15/32*; **F16L** *19/00*
U.S. Cl. 277—190 **2 Claims**



1. A pipe joint sealing device comprising an annular resilient body of rubber-like material, said body being generally of V-shaped cross-section which defines inner and outer annular body portions, a rigid concrete wall structure having an opening therein, said body being fitted into said opening in fluid-tight engagement therewith, said outer annular portion of said body having an interlocking engagement with said rigid structure provided by a socket-like portion in said structure which intimately engages said outer annular portion and holds the same against movement, the inside wall of one of said body portions having an annular relief therein which accommodates flexure of said rubber-like material theretoward relieving pressure against the pipe and concrete wall structure, and an elongated spreading element wedge-shaped in cross-section receiving between said annular body portions, said wall having at least one surface spaced from said socket-like portion thereby providing a corner portion of concrete between said surface and said socket-like portion.

3,973,784

CUTTING TOOL ADAPTOR

Donald Awalt Smith, 1125 Pawnee, Henderson, Nev. 89015

Filed July 8, 1974, Ser. No. 486,505
Int. Cl.² B23B *51/08*, *51/12*
U.S. Cl. 279—1 A **4 Claims**

1. An adaptor for rapidly coupling and decoupling a drill attachment to a power driven rotary screwdriver bit, said power screwdriver bit having a shaft of regular polygonal cross-section, said adaptor comprising a sleeve, bit-receiving means for securing a cutting tool bit at the front end of the sleeve, grip means carried by the adaptor for manually maintaining the adaptor on the screwdriver bit, and a cavity at the rear end of the sleeve for slidably engaging the shaft of the power screwdriver bit, the cavity having a regular polygonal cross section and being dimensioned such that when the adaptor is in place, relative rotary motion between the bit and the adaptor is prevented.

3,973,785

SLED

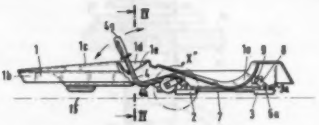
Klaus Becker, Wetter; Karl-Heinz Wolsi, Bochum-Langendreer, and Bernd Purath, Wetter, all of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed Jan. 13, 1975, Ser. No. 540,646

Claims priority, application Germany, Jan. 30, 1974, 2404337

Int. Cl.² B62B 13/18

U.S. Cl. 280—11 3 Claims



1. A coaster-type land vehicle, comprising in combination
a. an elongated shell-like body with a seat positioned adjacent the rear end thereof;
b. a front brake forward of said seat;
c. a rear brake rearward of said seat;
d. a horizontal axle;
e. a single operating lever pivotal around said horizontal axle, said operating lever movable in the longitudinal axis of said vehicle; the improvement characterized by
f. said front and rear brakes having substantially horizontal braking surfaces and disposed transverse to and along the longitudinal axis of said vehicle;
g. said operating lever having a substantially vertical portion forming the operating handle therefor, and a substantially horizontal portion extending to said axle;
h. first connecting means rigidly connecting said horizontal portion and said front brake, said first connecting means extending rearwardly from said pivot axle;
i. a linkage rigidly connecting said front and rear brakes;
j. said rear brake being suspended to pivot around a torsional axis parallel with said pivotal axle;
k. roller means; and
l. second connecting means rigidly connecting said horizontal portion and said roller means, said second connecting means extending forwardly from said pivot axle;
m. whereby pivoting said operating lever in one direction moves said front and rear brakes simultaneously into engagement with the vehicle sliding surface, and pivoting said operating lever in the opposite direction pivots said roller means into contact with said surface.

3,973,786

BELT RETRACTOR WITH WINDING PREVENTION MECHANISM

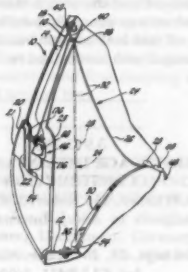
Lloyd W. Rogers, Jr., Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 28, 1975, Ser. No. 563,199

Int. Cl.² B60R 21/02

U.S. Cl. 280—747 4 Claims

1. A vehicle occupant restraint belt retractor adapted to be mounted on a vehicle body having a door movable between open and closed positions, said retractor comprising:
a housing, a belt reel rotatably mounted on the housing, a restraint belt attached to the reel and wound and unwound thereon during reel rotation, a winding spring normally biasing the reel in the belt winding direction of rotation, means for selectively locking the belt reel against belt unwinding rotation, a ratchet wheel mounted on the belt reel for rotation therewith and having ratchet teeth facing in the belt winding direction, a detent member movable between a detenting position engaging the ratchet teeth of the ratchet wheel to prevent belt winding reel rotation and an undetenting position permitting belt winding reel rotation by the winding spring, control means responsive to belt movement by the occupant to move the detent member to detenting position to prevent winding of the reel and thereby prevent belt tension on the occupant, and means responsive to movement of the



door from closed to open position to move the detent member to undetenting position upon opening movement of the door whereby belt winding reel rotation is permitted by the winding spring whenever the vehicle door is moved to open.

3,973,787

BOOKBINDING SYSTEM

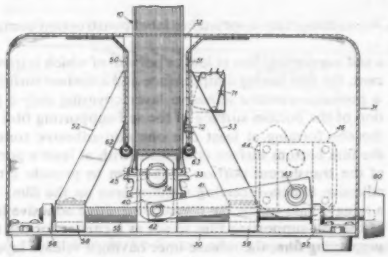
Henry N. Staats, Deerfield, and Robert K. Newcomb, Wilmette, both of Ill., assignors to General Binding Corporation, Northbrook, Ill.

Continuation of Ser. No. 371,550, June 19, 1973, abandoned.

This application May 15, 1975, Ser. No. 577,860

Int. Cl.² B42D 1/04

U.S. Cl. 281—21 R 5 Claims



1. The method of binding a plurality of sheets along one edge thereof which comprises: resting said sheets generally vertically on said one edge in a loose, unclamped, condition on a layer of thermally activatable adhesive supported on a backbone, heating said adhesive to melted condition sequentially cyclically lifting only one side portion of said backbone and the sheets supported thereon relative to the opposite side portion and the sheets supported thereon then lifting the the opposite side portion and the sheets supported thereon while lowering said one portion and the sheets supported thereon, thereby cyclically sliding adjacent sheets up and down relative to each other while in contact with the adhesive and while said adhesive is in heated and melted condition so that opposite sides of the sheets adjacent said edge resting on the adhesive are coated with the adhesive, and cooling said adhesive while maintaining said backbone generally perpendicular to the plane of said sheets.

5. The method of inserting an additional leaf in a book having sheets bound to a backbone by a heat activatable

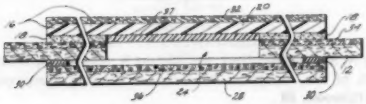
adhesive comprising the steps of heating the backbone while the book is resting thereon with the sheets thereof in a generally upright condition, to melt said adhesive inserting said leaf between adjacent sheets until an edge thereof rests on said adhesive and applying a downward load to said leaf simultaneously with cyclically lifting one side portion of the backbone with the sheets thereon and relatively lowering the opposite side portion thereof and the sheets thereon by pivoting said backbone about an axis generally parallel thereto so that the opposite sides of said leaf adjacent said edge resting on the adhesive are coated with said adhesive.

3,973,788

UNDERSURFACE IMPRINTABLE LABEL CONSTRUCTION

John A. Pekko, Whittier, and Robert J. Cardenas, Azusa, both of Calif., assignors to Avery International, San Marino, Calif.

Filed Sept. 26, 1973, Ser. No. 400,828
Int. Cl.² B41L 5/00
U.S. Cl. 282—19 R **11 Claims**



1. An undersurface imprintable label construction comprising:

a. a self-supporting film at least a portion of which is translucent, the film having a top surface and a bottom surface;

b. a pressure-sensitive adhesive layer covering only a portion of the bottom surface of the self-supporting film and thereby forming at least one one non-adhesive zone on the film bottom surface coincident with at least a portion of the translucent portion of the film to provide a non-adhesive indicia-receiving window area on the film,

c. a release liner below the pressure-sensitive adhesive layer of the self-supporting film to act as a carrier for the self-supporting film, the release liner having a release layer in contact with the pressure-sensitive adhesive layer of the film for allowing the self-supporting film to be readily released from contact with the release liner, and including at least one open window area aligned with the non-adhesive indicia-receiving window area on the film,

d. an indicia transferring layer beneath the release liner and facing the open window area of the release liner and aligned window area of the film, the indicia-transferring layer being capable of transferring visual indicia to a surface in contact with it in response to pressure being applied to the indicia-transferring layer, said indicia transferring layer being retained with the release liner upon release of the self-supporting film and pressure-sensitive adhesive layer from the release layer, and

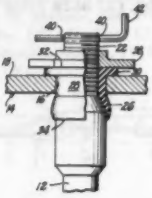
e. an indicia-receptive layer on the indicia-receiving window area of the film bottom surface, the indicia-receiving layer allowing indicia to be transferred from the indicia-transferring layer to the bottom surface of the film in the translucent indicia-receiving area thereof in response to the pressure being applied to the indicia-receiving area of the film top surface.

3,973,789

COUPLING STRUCTURE

Robert H. Kunz, Upland, and Gary L. Davis, La Puente, both of Calif., assignors to Chromalloy American Corporation, City of Industry, Calif.

Filed Apr. 25, 1975, Ser. No. 571,739
Int. Cl.² F16L 5/02, 59/12
U.S. Cl. 285—39 **1 Claim**



1. A coupling structure for use in securing a pipe to a mounting member which has an opening located therein, said structure consisting essentially of:

a pipe having a threaded end, a tapered, conical shoulder located concentrically around said pipe adjacent to said end, said shoulder diverging away from said end a cylindrical enlargement adjacent said shoulder and means for engaging said end of said pipe by a spanner tool,

an elastomeric sleeve fitting around said end adjacent to said shoulder, said sleeve having an outwardly extending flange located on its extremity remote from said shoulder and having an internal taper within the end thereof remote from said flange, said taper fitting against said shoulder, said sleeve having an external diameter substantially equal to the external diameter of said enlargement, said diameters being slightly less than the diameter of the opening in said member and

nut means threaded on said end and engaging said flange,

said pipe and said sleeve being capable of being inserted through said opening from one side of said member so that said flange fits against said side of said member and so that said pipe extends from the other side of said member,

when so inserted said pipe being capable of being manipulated as the result of engagement of said nut and said engaging means so as to cause movement of said nut toward said shoulder, such movement causing movement of said sleeve into engagement with said shoulder, such engagement causing expansion of said sleeve to a sufficient extent for said sleeve to engage said other side of said member and also to engage a portion of the external surface of said enlargement so as to hold said pipe against linear movement relative to said member.

3,973,790

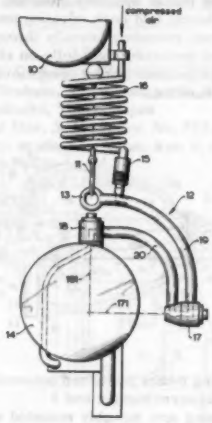
CARDAN FRAME WITH TWO SWIVEL JOINTS

Kurt Wenzel, Achern, Baden, Germany, assignor to Angenendt Verpackungssysteme GmbH, Achern, Baden, Germany

Filed Mar. 9, 1973, Ser. No. 339,609
Claims priority, application Germany, Mar. 10, 1972, 2211591
Int. Cl.² F16L 3/00, 27/00
U.S. Cl. 285—61 **2 Claims**

1. In combination with a strapping device including a conduit means to supply compressed air to said strapping device comprising: a spring expander, a first substantially 90° arcuate conduit having a connection to said conduit means for compressed air and attaching means at one end suspending it vertically on said spring expander, a second substantially 90° arcuate conduit, a first swivel joint connecting the other end of said first conduit to one end of the second conduit for movement of said second conduit about a horizontal axis and for transmitting air from said first to said second conduit, a

second swivel joint on the other end of said second conduit connected to said strapping device for transmitting air to said strapping device and for movement of said strapping device about an axis lying in a vertical plane through said attaching means and perpendicular to said horizontal axis and laterally



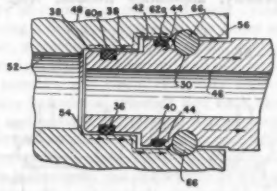
spaced from said first swivel joint, so that air is transmitted freely through said first and second swivel joints to said strapping device in every horizontal and vertical position with its center of gravity maintained substantially in the line of said attaching means.

3,973,791

SAFETY COUPLING DEVICE

Frank L. Porta, and Frank T. Porta, both of Elkview, W. Va., assignors to HPS Company, Inc., Charleston, W. Va.

Filed Oct. 9, 1974, Ser. No. 513,478
Int. Cl.² F16L *37/06*
U.S. Cl. 285—305 **6 Claims**



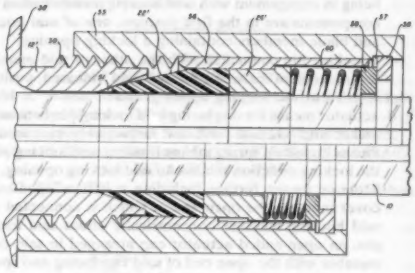
1. In a coupling device for connecting a conduit or the like carrying pressurized fluid comprising a first coupling member having first and second spaced generally peripheral grooves, each of which is defined by respective first and second pairs of shoulders and a peripheral depression formed adjacent one shoulder of said second pair of shoulders which is remote from said first groove; a pair of sealing members each of which is respectively received within said first and second grooves for effecting a fluid-tight seal; second coupling member positioned over said first coupling member with a tolerance therebetween and being detachably connected to said first coupling member and having at least first and second bores slidably receiving said first and second sealing members, and first and second openings extending generally transversely to the longitudinal axis of said first and second bores and each being arranged adjacent to and in open communication with an opposite side of said peripheral depression; and retaining means including a pair of retaining members each of which respectively frictionally cooperates with said first and second openings and said peripheral depression to interlock said first and second coupling members together, and which deforms at least a portion of said one shoulder so as to flare generally radially outwardly into frictional engagement with said second bore to close the tolerance between said one shoulder and at least a portion of said second bore, said second bore being dimensioned to enable said frictional engagement, whenever at least a predetermined proportion of a burst pressure is reached such that said first coupling member may not be slidably received by said first and second bores for enabling interlocking of said first and second coupling members by said retaining means whenever said first coupling is attempted to be reinserted in said second bore.

3,973,792

CONNECTING DEVICE FOR CONNECTING CHROMATOGRAPHIC SEPARATING COLUMNS OF GLASS

Winfried Karl Glüner, Uberlingen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Germany

Division of Ser. No. 432,805, Jan. 14, 1974. This application Nov. 3, 1975, Ser. No. 627,850
Int. Cl.² F16L *17/00, 19/06, 19/08, 21/02*
U.S. Cl. 285—341 **5 Claims**



1. A connecting device for coupling glass chromatographic separating columns to chromatographic instruments comprising:

a. a metallic sleeve surrounding an end of such a column;

b. a sleeve of synthetic plastic material, possessing dimensional stability at temperatures of up to at least 350°C, coaxially surrounding said column adjacent said metallic sleeve, said plastic and metallic sleeves having generally complementary conical end surfaces in confronting relation and partially overlapping;

c. a sleeve-shaped thrust member coaxially disposed about said column adjacent said plastic sleeve and axially displaceable relative to said metallic sleeve;

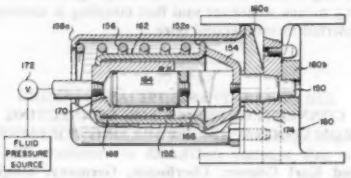
d. an axial adjustment sleeve coaxially surrounding said thrust member and in threaded engagement at one end with said metallic sleeve; and

e. resilient force-exerting means between said thrust member and the other end of said adjustment sleeve to exert an axial force on said plastic sleeve to generate a radial sealing force between the plastic sleeve, the column, and the metallic sleeve by abutting coaction of said complementary end surfaces.

3,973,793
LOCKING MECHANISM INCLUDING A LOCKING PIN

Charles M. Hirst, Jr., and Eugene C. Lipshield, both of Moberly, Mo., assignors to Orschein Brake Lever Mfg. Company, Moberly, Mo.

Filed Sept. 30, 1974, Ser. No. 511,023
Int. Cl.² E05C 1/06
U.S. Cl. 292—144 3 Claims



1. A locking assembly for locking together a pair of components which are displaceable between first and second positions in which said components are adjacent and spaced from each other, respectively, comprising

a. a housing member adapted for connection with one of said components adjacent the other of said components;

b. a blade member adapted for connection at one end with the other of said components opposite said housing, the other end of said blade member extending toward and being in engagement with said housing member when said components are in the first position, one of said housing and blade members containing a locking opening;

c. a locking pin connected with the other of said members for movement between locked and released positions relative to said locking opening; and

d. actuator means for displacing said locking pin between its locked and released positions, respectively, said actuator means including spring means biassing said locking pin in the locking direction relative to said locking opening, said actuator means further including a hollow open-ended cover member the open end of which is connected with said housing member concentrically about said locking pin, an open-ended actuator cap arranged in said cover member with the open end of said cap facing and spaced from said locking pin, said cap having at its open end an external flange, and a first yoke member connecting the open end of said cap with said locking pin, said spring means comprising a compression spring arranged concentrically about said cap between said external flange and an end wall portion of said cover member at the end thereof remote from said open end.

3,973,794
INTERIOR DOOR LATCH ASSEMBLY

Leonard Green, 620 E. Pine St., Santa Ana, Calif. 92701

Filed Apr. 30, 1975, Ser. No. 572,959
Int. Cl.² E05C 3/08
U.S. Cl. 292—254 7 Claims

1. A door latch assembly comprising:

a pair of oppositely disposed handles having a door positioned therebetween, said door including a notch along the leading edge thereof;

a carriage housing formed integrally as part of one of said handles, and adapted to be removably mounted in said notch of said door, said housing defining a compartment therein and having a latch opening arranged therein;

a latch assembly mounted in a door jamb for direct latching engagement with said carriage housing to retain said door in a closed position, wherein said latching assembly comprises:

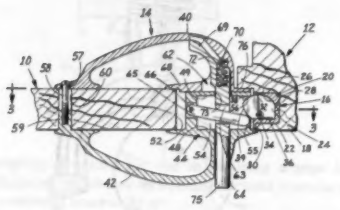
a keeper housing having a compartment formed therein;

a keeper mounted within said compartment of said keeper housing for arcuate movement therein; and

means for biasing said keeper outwardly from said compartment thereof, said keeper being disposed within said housing; and

latch-releasing means operably mounted in said carriage housing; wherein said latch releasing means comprises:

a carriage lever extending laterally through said carriage housing and projecting outwardly on either side of said door, said projections thereof being movably supported in respective handles;



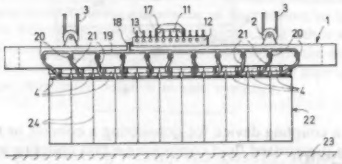
a spring-biasing means positioned between one end of said lever and adjacent handle; and

a latch-releasing arm movably mounted within said compartment of said carriage housing, having one end thereof pivotally connected to said housing and the opposite free end thereof terminating adjacent said latch opening in said housing for direct engagement with said keeper, when said keeper is to be disengaged from said carriage housing, whereby said door is allowed to open said arm being operably coupled to said carriage lever.

3,973,795
LIFTING DEVICE FOR HANDLING CUT CELLULAR CONCRETE BODIES

Rolf Erik Goransson, Akarp, Sweden, assignor to Internationella Siporex Aktiebolaget, Malmo, Sweden

Filed Aug. 19, 1975, Ser. No. 605,966
Claims priority, application Sweden, Aug. 20, 1974, 7410555
Int. Cl.² B66C 1/02
U.S. Cl. 294—65 6 Claims



1. A lifting device for changing the distance between separate parts of a generally parallelepipedic cellular lightweight concrete body that has been divided by at least one vertically extending cut comprising a generally horizontal frame structure that is vertically movable in relation to a support, from which the cut body may be lifted, a plurality of carriers, each of which has means thereon for gripping a part of the body and for keeping that body part suspended when lifted, means supportingly connecting each of said carriers to said frame structure in a manner to permit guided movements of each and all of the various carriers relative to said supporting frame structure in a predetermined, generally horizontal direction, in which said carriers form a row, and a plurality of actuators for moving said carriers in said predetermined direction, wherein there is one actuator group directly connecting every

two adjacent carriers, each such actuator group being operable selectively and independently of all the other groups and without positional reference to said frame structure, and wherein one of said interconnected carriers only is connected to said supporting frame structure by means defining the position of said one carrier relative to said frame structure.

3,973,796

OPERATOR'S CAB IN A CONSTRUCTION VEHICLE

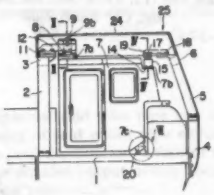
Yasuo Suzuki, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 555,038

Claims priority, application Japan, Apr. 9, 1974, 49-39425; Apr. 9, 1974, 49-39426

Int. Cl.² B62D *27/04*

U.S. Cl. 296—28 C **4 Claims**



1. An operator's cab in a construction vehicle having a chassis and a pair of front upstanding posts and a pair of rear upstanding posts, both the pairs of posts being respectively secured in the chassis of said vehicle, and further comprising:

a. a first suspension means for forwardly and rearwardly as well as leftwardly and rightwardly swingably supporting one side of the forward and rearward upper sides of said cab and which has a universal joint with axles extending perpendicularly to each other, one of said axles being pivotally connected to one pair of said pairs of posts, while the other axle is pivotally connected to one of the said forward and rearward upper sides of said cab, and

b. a second suspension means for cushioningly supporting the other of said upper sides of said cab which has a plurality of cylindrical members, each cylindrical member having a first end secured to the other upper side of said cab, a plurality of support shafts, each shaft having a first end received by a second end of a respective cylindrical member and being resiliently supported in the respective cylindrical member and each shaft having a second end secured to the other pair of posts, and cushioning members interposed between each of said cylindrical members and each of said support shafts, whereby said cab is forwardly and rearwardly as well as leftwardly and rightwardly cushioningly supported by said chassis.

3,973,797

SEAT BACKREST HAVING AN ADJUSTABLE LUMBAR SUPPORT

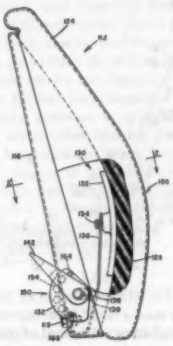
Albert Anthony Obermeier, Waterloo, and James Edward Thompson, Cedar Falls, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 31, 1975, Ser. No. 563,591

Int. Cl.² A47C *3/00*

U.S. Cl. 297—284 **4 Claims**

1. A seat back rest comprising: a rigid frame supporting a contourable portion constituted by a flexible covering and an elastomeric layer interposed between the covering and the frame; and means between the frame and the covering to impart a curvature to the covering to produce a desired contour including a lumbar pad, a cantilevered resilient member rigidly attached to the base of the frame at one end and to the lumbar pad at the other end, an eccentric bar pivotally mounted in the frame proximate the base of the frame for pivotation about a horizontal axis and having an offset crank portion parallel to the horizontal axis and having an offset crank portion parallel to the horizontal axis abutting the resilient member and rotatable toward the base of the frame for camming the resilient member away from the frame, said eccentric



bar having an adjusting lever attached to one end, said adjusting lever substantially longer than the offset of the crank portion and position detent means for holding the eccentric bar in a plurality of positions.

3,973,798

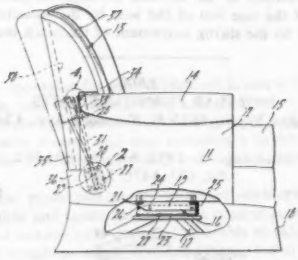
DEFLECTABLE CHAIR BACK

David B. White, Monroe, Mich., assignor to La-Z-Boy Chair Company, Monroe, Mich.

Continuation-in-part of Ser. No. 458,234, April 5, 1975, abandoned. This application Mar. 5, 1975, Ser. No. 555,607

Int. Cl.² A47C *3/00, 7/00*

U.S. Cl. 297—296 **6 Claims**



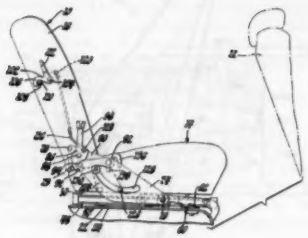
1. In a chair, a chair frame having a central seating area and an arm at each side, a supporting base, a back frame separate from said chair frame, upholstering material on said chair and back frames, a pair of unstressed spring rods for supporting said upholstered back frame at the rear of said chair frame to extend upwardly thereon so that the upholstering material at the sides of the back frame is in engagement with the upholstered material at the rear of the arms of said seat frame to provide the appearance of a continuous back frame on the chair frame, said back frame being deflectable rearwardly on said spring rods which are hidden beneath the upholstering material on said back frame which is in engagement with that on said arms.

3,973,799

SWIVELING AND FOLDING BENCH SEAT

Alan D. Berg, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 18, 1975, Ser. No. 614,480
Int. Cl.² A47C 1/02; B60N 1/02
U.S. Cl. 297—341 3 Claims



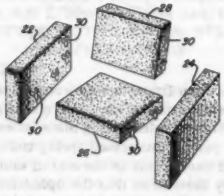
1. A seat for a motor vehicle comprising: a seat cushion, means pivotally mounting a first end of the seat cushion on the motor vehicle, track means mounting a second end of the seat cushion on the motor vehicle to permit fore and aft sliding movement of the second end of the seat cushion between a normal rearward position and a forward position facilitating access behind the seat cushion, a seat back, a link located adjacent the second end of the seat cushion, pivot means connecting one end of the link to the vehicle body, seat back pivot means pivotally connecting a first end of the seat back to the first end of the seat cushion and pivotally connecting a second end of the seat back to the other end of the link to permit the seat back to be folded downwardly to a cargo floor forming position overlying the seat cushion, latch means acting between the link and the seat back to prevent pivotal movement of the seat back relative the link when the latch means is engaged to thereby prevent forward folding movement of the seat back to the cargo floor forming position, and means acting between the seat cushion and the link whereby when the latch means is latched, and forward pivoting movement of the seat back pivots the link, the seat cushion is moved forwardly to the forward position as permitted by pivoting of the one end of the seat by the associated pivot means and by the sliding movement of the track means.

3,973,800

MODULAR FURNITURE UNITS

Allan Sheldon Kogan, 5633 N. Kenmore Ave., Chicago, Ill. 60505

Filed Aug. 15, 1975, Ser. No. 604,902
Int. Cl.² A47C 7/00
U.S. Cl. 297—440 11 Claims



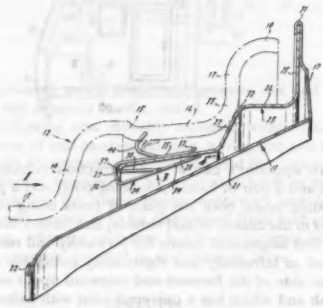
1. A non-locking knock-down furniture assembly which is quick and easy to assemble and disassemble by mere manual vertical movement of furniture parts comprising opposing upstanding members, each having inwardly facing hooking devices, a seat member and a back member each having outwardly facing hooking devices for vertically slidable and releasable non-locking engagement with the inwardly facing hooking devices of said members, each of said hooking devices being individually integral and identical to each other, each comprising a vertically depending breastplate element and a ledge element extending horizontally therefrom and having a receiver for vertically receiving the breastplate element of the other identical hooking device and supporting the other hooking device by planar facial engagement of the hooking device ledge elements.

3,973,801

WHEEL TRIM RETENTION MEANS

Hans R. Beisch, Amherstburg, Canada, and Harold C. Marks, Northville, Mich., assignors to Norris Industries, Inc., Ypsilanti, Mich.

Filed Feb. 13, 1975, Ser. No. 549,554
Int. Cl.² B60B 7/00
U.S. Cl. 301—37 C 13 Claims



1. Wheel trim retention means for mounting a wheel trim member on a tire rim of the type having a generally axially extending intermediate flange, comprising:

an annular retention member connected to a wheel trim member and having a generally axially extending portion;

a radially directed flange extending from the axially inner end of said retention member portion;

a plurality of retaining clips mounted on said retention member, each retaining clip being formed of spring-like material and having opposed inner and outer elements connected by a web, said elements being spreadable so that the clip may be slipped over said retention member flange;

a locking tab on one of said elements of each said clip extending into the space between said elements, the relative dimensions of the parts being such that said locking tab will snap into position behind said retention member flange when the clip is slipped onto the retention member; and

a resilient retaining finger on each said clip having an outwardly facing edge, the unstressed shape of said finger being such that said edge will bite into the inner surface of said intermediate flange when the retention means is inserted into the tire rim.

3,973,802

CONVEYOR LINE FLUIDIZER

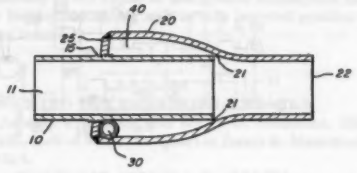
Sung Lim Kwon, St. Paul, and Josef Pausch, Minnetonka, both of Minn., assignors to General Resource Corporation, Hopkins, Minn.

Filed Mar. 6, 1975, Ser. No. 556,005
Int. Cl.² B65G 53/58
U.S. Cl. 302—24 7 Claims

1. An apparatus for propagating particles suspended in a gaseous stream through a conveying system, comprising:

a. an inlet pipe having a first end constructed for connection into the conveying system in axial flow alignment with said gaseous stream;

b. an outlet pipe having a first end constructed for connection into the conveying system in axial alignment downstream of said inlet pipe, said outlet pipe having an axially-symmetric expanding contour fitted over said inlet pipe, and having an end plate closing about said inlet pipe, said end plate being inclined at an angle of from 2° to 45° from a plane which is perpendicular to the inlet pipe axial direction;



c. a chamber external said inlet pipe and formed by the interior surfaces of said outlet pipe expanding contour and end plate, and the exterior surface of said inlet pipe, and having an annular output orifice about the interior end of said inlet pipe;

d. an inlet for receiving pressurized gas, opening into said chamber at a point approximately tangential to the chamber inner surface and adjacent the inclined end plate at a position closest to said inlet pipe first end; and

e. means for telescoping said inlet pipe into said outlet pipe expanded contour through said inclined end plate, for varying the chamber output annular orifice size.

3,973,803

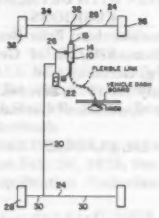
VALVE-CONTROLLED BRAKING SYSTEM FOR VEHICLES

Gerald J. Seward, and Robert P. Walters, both of Box 224 R 5, Blackfoot, Idaho 83221

Continuation of Ser. No. 364,825, May 29, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,672

Int. Cl.² B60T *17/16*

U.S. Cl. 303—89 **1 Claim**



1. In combination, in a vehicle having front and rear wheels and a master hydraulic cylinder for front and rear wheel braking systems;

a first hydraulic feed line connecting said cylinder to the junction of feedlines to the individual rear wheel brakes;

a second hydraulic feed line connecting said cylinder to the junction of feedlines to the individual front wheel brakes;

a manually controlled valve having open and closed positions, and valve having a rod which is rotated in one direction to close the valve and is rotated in opposite direction to open the valve; manually operable means accesible to a driver in the interior of the vehicle for opening and closing the valve, said means including a rotatable flexible linkage connected at one end to said rod and at the other end to a rotatable knob on the dashboard of the vehicle;

means inserting said valve in the hydraulic feed path of the second line between the cylinder and the feed line junction of front wheel brakes for the hydraulic fluid to pass through to the front wheel brakes when the valve is open and fluid flow to the front wheel brakes is blocked when the valve is closed, said inserting means including that when the valve is closed before brake pressure is applied only the rear wheels can be braked and the front wheels move freely for permitting the driver of a vehicle to have enhanced control on icy or slippery road surfaces, said inserting means further including that when the valve is closed after brake pressure is applied the front wheels remain locked when other braking pressure is removed for providing a braking assist when a vehicle is parked on steep hills; and means at the dashboard of the vehicle being connected by said flexible linkage to the rod for the driver of the vehicle to remotely open and close the valve by operating the dashboard means.

3,973,804

APPARATUS FOR LOAD-DEPENDENT CONTROL OF VEHICLE

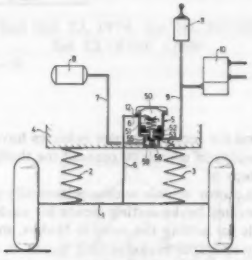
Ortwin Engfer, Stuttgart, and Eberhard Korkowski, Schwieberdingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Mar. 28, 1975, Ser. No. 562,927

Claims priority, application Germany, Apr. 24, 1974, 2419754

Int. Cl.² B60Q *1/10*; B60T *8/18*, *17/00*

U.S. Cl. 303—2 **3 Claims**



1. An apparatus for load-dependent pressure regulation in a vehicle, said vehicle including axle means and body means as well as spring means for elastic coupling of said body means to said axle means, and also including a brake system and adjustable headlamp mounting means, said apparatus comprising:

pressure modulator means mounted on the body of the vehicle and containing movable control members;

control linkage rods, attached pivotably to said axle means and to said pressure modulator means for displacing said movable elements in said pressure modulator means in dependence on the distance between said body and said axle;

a source of pressurized fluid, connected to said pressure modulator to provide pressurized fluid thereto;

a brake force regulator, connected to said pressure modulator to receive pressurized fluid therefrom and connected to said brake system for adjusting the braking force exerted by the brake system of the vehicle; and

a pneumatic servo-member, connected to said pressure modulator and to said adjustable headlamp mounting means, for changing the position of said adjustable headlamp mounting means in relation to pressure, said modulator providing a load-dependent control pressure to said brake force regulator and to said pneumatic servo-mem-

ber; whereby the braking force exerted by the brakes and the position of said adjustable headlamp mounting means are simultaneously adjusted in load-dependent manner

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3,973,805

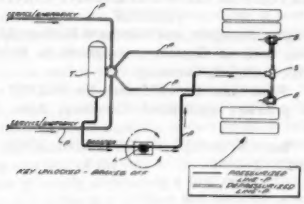
MOTOR VEHICLE SECURITY SYSTEM AND SECURITY METHOD

Billy E. Stevenson, Huntington Beach, and Thomas R. Rumsey, Inglewood, both of Calif., assignors to Royal Industries, Inc., Pasadena, Calif.

Continuation of Ser. No. 380,587, July 19, 1973, abandoned, which is a division of Ser. No. 181,673, Sept. 20, 1971, Pat. No. 3,770,324. This application Feb. 14, 1975, Ser. No. 549,814

Int. Cl.² B60T *13/38*

U.S. Cl. 303—9 **4 Claims**



3. A method for securing motor vehicles having brakes for each of a plurality of wheels to prevent the theft thereof comprising the steps of

providing a motor vehicle with mechanically powered manually operated brake setting means for each of a plurality of wheels for setting the vehicle brakes, maintaining the manually operable brake setting means in a non-braking position so as to maintain the pressurized air applied to the brake setting means and thereby the vehicle brakes in a non-set position,

manually operating the mechanically powered brake setting means through the exhausting of the pressurized air applied thereto to set the brakes, once set, the brakes being maintained in a set condition until manually reset through brake resetting means, lockably securing the brake resetting means at the brake by operating a key actuated lockable means to prevent unauthorized access to the interior of the brake setting means and thereby prevent the unauthorized manual resetting of same,

coupling manually operated key actuated valve control means having a brake locked and brake unlocked position to pressurized air for controlling the application of the pressurized air to the brake setting means, operating the valve control means to the brake locked position through the exhaustion of the pressurized air applied thereto for normally maintaining the brake setting means in a brake unlocked condition to prevent the movement of the motor vehicle when the brakes are set, the valve control means being operable for controlling the application of the pressurized air independently of the manual means and locking the valve control means with a key upon setting the brakes through the valve control means to prevent the unauthorized operation of the control means.

3,973,806

POWERED BRAKE SYSTEM FOR VEHICLES

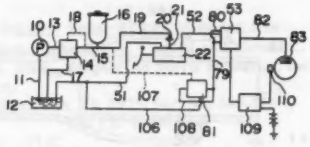
Masami Inada, Toyoake, and Toshiyuki Kondo, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 415,813, Nov. 14, 1973. This application Apr. 28, 1975, Ser. No. 572,314

Claims priority, application Japan, Nov. 14, 1972, 47-114402

Int. Cl.² B60T *8/02*

U.S. Cl. 303—21 AF **6 Claims**



1. A powered brake system for vehicles comprising:

wheel brake cylinders;

a pump powered hydraulic pressure source;

a reservoir hydraulically connected to said pump powered hydraulic pressure source;

main control valve means interposed between said wheel brake cylinders and said pump powered hydraulic pressure source for controlling the fluid pressure to said wheel brake cylinders;

subcontrol valve means interposed between said wheel brake cylinders and said main control valve means for alternatively connecting said wheel brake cylinders to either one of said reservoir and said main control valve means for performance of an anti-skid control operation as required; and

safety valve means interposed between said reservoir and said subcontrol valve means, including a valve member for controlling the communication between said reservoir and said subcontrol valve means according to a failure of said pump powered hydraulic pressure source, and a control member for controlling said valve member according to said failure to said pump powered hydraulic pressure source.

3,973,807

WIRE CABLE CHAIN WITH DETACHABLE TRAVELING CUSHIONS

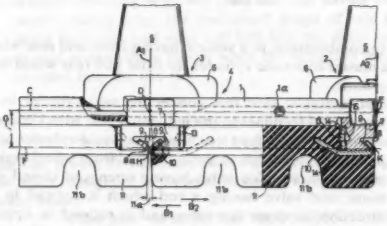
Otto Korner, Wermelskirchen; Fritz Benninghoff, and Klaus Spies, both of Remscheid, all of Germany, assignors to DIEHL, Nurnberg, Germany

Filed July 15, 1974, Ser. No. 488,484

Claims priority, application Germany, July 19, 1973, 7326485

Int. Cl.² B62D *55/18*

U.S. Cl. 305—40 **9 Claims**



1. In combination with a wire cable chain having a running direction; spaced chain links each having a transverse plane of

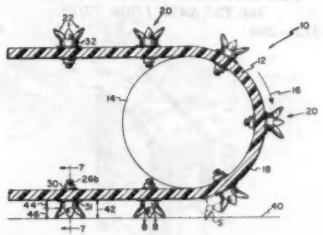
symmetry, wire cables connecting said links and extending in the running direction of said chain, and running cushion structures extending between and connected to pairs of adjacent links, each link having transverse groove means formed therein with an open end thereof, each said cushion structure comprising a body of flexible, resilient material elastically connecting successive links and transverse metal guide rails carried thereby at opposite ends and connected to said successive links, said guide rails being positively insertable transverse to the running direction of the chain in the open ends of said groove means on opposite sides of said plane of symmetry and slidable laterally of the chain in said groove means, and lock means for locking said guide rails in fully inserted position in said groove means.

3,973,808

ICE STUD FOR SNOWMOBILE TRACKS

Roger G. Janssen, Crookston, and Wayne G. Schantzen, Thief River Falls, both of Minn., assignors to James R. Musselman, Hope, Mich.

Filed Dec. 12, 1974, Ser. No. 532,301
Int. Cl.² B62D *55/24*
U.S. Cl. 305—54 **36 Claims**



1. A one piece stud for an endless snowmobile drive track or the like comprising:
   a central mounting hub having a cylindrical sidewall parallel to the longitudinal axis of said stud;
   a plurality of perimetrically disposed radially outwardly flaring ground engaging projections diverging radially outwardly from said sidewall and in a direction axially away from said hub.

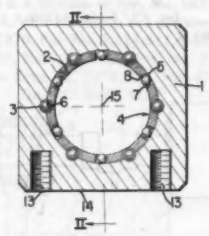
3,973,809

AXIAL BALL BEARING AND HOUSING

Hendrik Gehardus Franciscus Breteler, prinule Staraat fr., Dedemsvaart, and Hendrik Prins, Zwalse wet 157, Balkbrug, both of Netherlands

Continuation of Ser. No. 351,785, April 16, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,342
Claims priority, application Netherlands, Apr. 17, 1972, 7205122
Int. Cl.² F16C *29/06*
U.S. Cl. 308—6 C **7 Claims**

1. An axial ball bearing comprising a housing block having a cylindrical bore extending therethrough for receiving a shaft, said block being a solid metal body sufficiently massive to sustain the load of said shaft and preformed with a flat external mounting surface precisely located relative to the axis of said bore and constituting means for positioning said block on a support surface in position to receive said shaft, a plurality of grooves spaced circumferentially and extending axially in the bore wall and bottomed in the metal of said block, a cylindrical ball cage fitted within said bore, said cage and said wall defining a plurality of endless channels each of which contains a series of bearing balls, each of said channels comprising an iner axial channel portion opening inwardly from said cage and from which balls seated on said bore wall protrude to provide ball surfaces for supporting said shaft and an outer axial channel portion opening outwardly from said cage and from which balls protrude into one of said grooves so as to roll therein axially of said cage yet to prevent relative rotation between said cage and said block, said ball surfaces defining a precisely located bearing surface of cylindrical outline to receive said shaft, the diameter of which is determined solely by the diameter of said bore wall and the diameter of said balls, said block constituting the sole housing of the bearing and, when positioned through said mounting surface, constituting the entire load sustaining structure thereof.

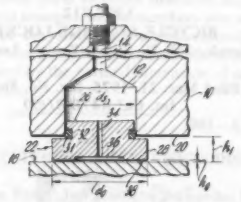


3,973,810

HYDROSTATIC GAS BEARING SYSTEMS

Mordechai Montag, Three Malton Road, Plainview, N.Y. 11803

Filed Oct. 23, 1974, Ser. No. 517,085
Int. Cl.² F16C *17/00*
U.S. Cl. 308—9 **4 Claims**

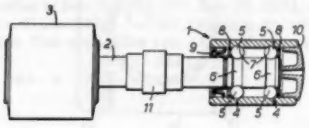


1. A hydrostatic gas bearing system using a gas pressure source for frictionless transmittal through a controlled gas film of a balancing force for maintaining close guided relationship between frictionlessly suspended bodies, comprising
   a. a first carrying body,
   b. a second body having a guide surface,
   c. one or more floating pads flexibly mounted and pneumaticaly sealed into first carrying body having opposed surfaces dimensionaly interrelated (d_s and d_o) and pneumaticaly interconnected with sealed surface in first carrying body (ch_s) exposed to said gas supply pressure,
   d. bearing surfaces on said first and second bodies geometricaly located and frictionlessly supported by a gas film to oppose and balance forces frictionlessly transmitted from the floating pads through a gas film (h_o) to the said guide surface on the second body, Said geometric arrangements allowing frictionless movement perpendicular to said forces and in the direction of the bearing surfaces with the floating pad serving to maintain balanced relationship between bearing and guide surfaces and to compensate for limited dimensional variations.

3,973,811
BALL BEARING ROLLERS FOR RING SPINNING MACHINES

John Michael Noguera, 1 Greville House, Kinnerton St., London SW.1, England

Filed Jan. 8, 1975, Ser. No. 539,432
Claims priority, application United Kingdom, Jan. 14, 1974, 1700/74
Int. Cl.² F16C *13/00*
U.S. Cl. 308—189 R 6 Claims

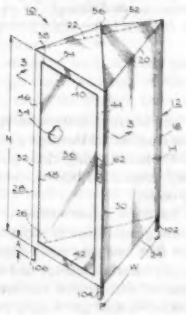


1. A ball bearing roller unit for a ring spinning machine and the like, comprising a pair of hollow rollers mounted, spaced from one another, on a common spindle; first seals serving to close the inner ends of said rollers, said spindle being formed to permit displacing said first seals along said spindle from positions between said rollers and clear thereof to roller-closing positions; a pair of bearings within each of said rollers, spaced apart axially of the latter, and each including bearing elements with cages; said elements being partially contained in an inner track formed in said spindle and in an outer track formed in the inner surface of said rollers; and second seals serving to close the outer ends of said rollers; said cages having pockets, one for each of said bearing elements, that are all open to one common side of said bearings; wherein said spindle is of a constant diameter save for said tracks; that is said spindle has at no point along its length a diameter greater than that in the vicinity of said bearings.

3,973,812
BICYCLE STORAGE LOCKER

Henry Poltorak, 350 N. Sierra Bonita, Los Angeles, Calif. 90036

Filed Mar. 21, 1975, Ser. No. 560,631
Int. Cl.² A47B *81/00*
U.S. Cl. 312—100 8 Claims



1. A bicycle storage locker for the storage of a bicycle in a vertical orientation and comprising, in combination:

an open bottom, vertically extending case means having:

a pair of side members intersecting at a first edge and having a pre-selected height between top edges and bottom edges thereof;

a base member having a top edge and a bottom edge and coupled to said side members on second edges thereof spaced from said first edges, to define a bicycle storage cavity therebetween;

a pyramidical top member coupled to said base member and said side members along the top edges thereof and having an apex at a pre-determined height above said top edges;

a door means pivotally coupled to said base member to define a bicycle accepting aperture therethrough to allow passage of a bicycle into said storage cavity;

bicycle supporting hook means coupled to said top member at said apex thereof and interior said storage cavity;

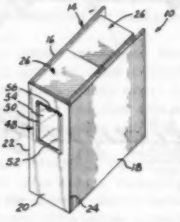
lock means for locking said door means to said base member; and

leg means for supporting said case means a predetermined distance from the ground, whereby a bicycle is supported in said bicycle storage cavity in a vertical orientation and having one of the front wheel and rear wheel mounted on said bicycle supporting hook means.

3,973,813
MICROFILM STORAGE DEVICE

Charles A. Nesmith, Jr., c/o Stappenbeck Bookbindery, Inc., Box 656, 223 E. Douglas St., Bloomington, Ill. 61710

Filed June 10, 1974, Ser. No. 477,637
Int. Cl.² A47B *17/04, 77/18*
U.S. Cl. 312—204 4 Claims



1. A hand-manipulatable book-shaped device for storing microfilm cartridges and the like, comprising a three-sided book-like shaped support cover having a pair of generally rigid side walls and a generally rigid intermediate wall connected along its longitudinal edges to longitudinal edges of said side walls, at least one of said side walls being hingedly connected to said intermediate wall for movement between open and closed positions relative to the other of said side walls, said side walls having lower marginal edges facilitating placement and storage of said device in upstanding relation on a book shelf, a pair of generally rectangularly shaped cartridge support receptacles secured in side-by-side relation to one of said side walls so as to be disposed between said side walls when in their closed positions, said support receptacles defining storage chambers open on the sides thereof facing outwardly from said one of said side walls to which they are secured, said receptacles having stationary top and bottom walls extending between said rigid side walls of said support cover and said receptacles having lateral side walls parallel to said intermediate wall with one of said lateral side walls being exposed and cooperating with said top and bottom walls and said side walls of said support cover to define an enclosed storage chamber when said hingedly connected side wall is in its closed position, said receptacles being box shaped, a plurality of support shelves supported within each of said receptacles within said chamber to receive microfilm cartridges in supporting relation thereon in substantially parallel relation to said lower marginal edges of said side walls, said movable side wall being adapted for movement to expose said shelves for loading and unloading of said cartridges, said movable side wall cooperating with the other of said side walls to retain said cartridges within said receptacles when said movable side wall is in its said closed position, said device having a depth substantially equal to the

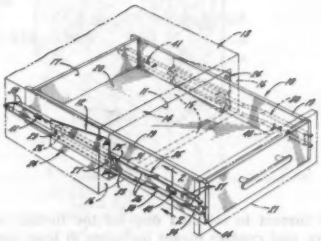
depth of said book shelf, and substantially the full depth of said device between said side walls being occupied by said cartridge support receptacles for receiving microfilm cartridges thereon.

3,973,814

DRAWER SLIDE ASSEMBLY FOR SELF-CLOSING DRAWER

Ronald K. Entrikin, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.

Filed June 4, 1975, Ser. No. 583,761
Int. Cl.² A47B 88/04; F16C 21/00
U.S. Cl. 312—333 2 Claims



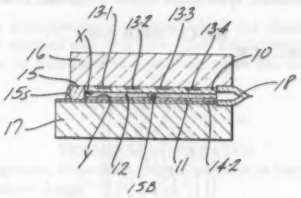
1. A self-closing drawer slide assembly supporting a drawer to slide between open and closed positions within an opening in a cabinet, said assembly comprising first and second brackets mounted within said cabinet adjacent the sides of said opening, front and rear rollers journaled on each of said brackets, first and second tracks secured to opposite sides of said drawer, said rollers engaging said tracks to support said drawer slidably within said cabinet, each of said tracks comprising substantially horizontal forward and rearward sections and an intermediate ramp section extending therebetween and being slanted downwardly at a preselected angle upon progressing rearwardly from said forward section toward said rearward section, elongated slots formed in and opening horizontally out of the sides of said drawer, said slots being spaced upwardly from and extending parallel with the bottom of said drawer, forward and rearward tabs integrally formed with said forward and rearward sections, respectively, and projecting horizontally therefrom into said slots to support said tracks vertically on said drawer, said rearward tab of each track being spaced upwardly from the lower edge of said rear section a distance greater than the distance said forward tab is spaced upwardly from the lower edge of said forward section but being located in the same horizontal plane as said forward tab when said track is secured to said drawer whereby said ramps are positioned precisely on the drawer so the drawer closes automatically from a slightly open position, and fasteners extending through said tracks and into the sides of the drawer to secure the tracks thereto.

3,973,815

ASSEMBLY AND SEALING OF GAS DISCHARGE PANEL

Wolfgang W. Bode; James F. Nolan, both of Sylvania; Lawrence V. Pfaender, Toledo; Theodore C. Baker, Toledo, and Richard G. Mathias, Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 364,709, May 29, 1973, Pat. No. 3,879,634, which is a division of Ser. No. 163,043, July 15, 1971, Pat. No. 3,746,420, which is a division of Ser. No. 783,010, Jan. 5, 1970, Pat. No. 3,614,511, which is a division of Ser. No. 686,384, Nov. 24, 1967, Pat. No. 3,499,167. This application June 12, 1974, Ser. No. 478,464
Int. Cl.² H01J 9/38
U.S. Cl. 316—20 3 Claims



1. A process for constructing a gaseous discharge display/memory device comprising

assembling discrete parts, including (1) a pair of transparent flat members with printed circuit metallization and dielectric coating formed on said printed circuit metallization and said transparent flat members, (2) a plurality of elongated spacer rods and (3) a heat fusible sealing material,

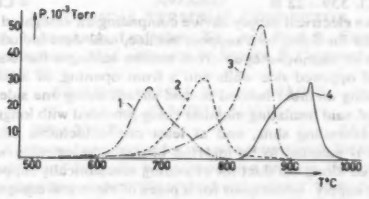
heating said assembly of discrete parts to a temperature above the softening point of said heat fusible sealing material but below the softening temperature of said assembled discrete parts to effect fusion of said sealing material and said transparent flat members into an impermeable envelope for confining a predetermined volume of gas whereby the space between the walls of said envelope is controlled by the vertical dimension of said elongated spacer rods.

3,973,816

METHOD OF GETTERING A TELEVISION DISPLAY TUBE

Adrianus Maria Van Bakel; Jan Josephus Bernardus Fransen, and Adrianus Kuiper, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 388,394, Aug. 15, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,642
Claims priority, application Netherlands, Sept. 30, 1972, 7213275
Int. Cl.² H01J 7/18
U.S. Cl. 316—25 6 Claims



1. A method of absorbing residual gases in a television display tube comprising the steps of heating a holder containing a quantity of $BaAl_4$, a nickel-containing material, and

germanium nitride (Ge_3N_4), to a temperature of 600° to 800°C to pre-degas the contents of said holder, placing the holder with the predegassed contents in the tube, and thereafter heating the holder contents to a temperature of about 900°C to react the constituents in the holder releasing barium and nitrogen, the barium being deposited as a porous layer of uniform thickness on the wall of the tube.

3,973,817

INTERCONNECTION OF CIRCUIT BOARDS

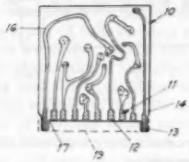
Anthony Donald Stalley, Camberley, and Michael Anthony Richard Young, Newbury, both of England, assignors to Quantel Limited, England

Filed June 3, 1975, Ser. No. 583,384

Claims priority, application United Kingdom, June 6, 1974, 24075/74

Int. Cl.² H01R 3/06

U.S. Cl. 339—14 R 3 Claims



1. A circuit board having a multiway connector disposed along one end thereof for insertion into a corresponding connector, said multiway connector including:

a. a plurality of elongate contacts disposed in parallel relationship with each other,

b. earth path contacts forming part of said plurality of contacts and each having one end lying in a first plane,

c. the remainder of the plurality of contacts not forming the earth path contacts each having one end lying in a second plane, said second plane being in substantially parallel relationship with said first plane but set back therefrom,

whereby on insertion of said board into said corresponding connector said earth path contacts are the first to make connection with said corresponding connector, and on extraction of said board from said corresponding connector said earth path contacts are the last to break connection with said corresponding connector.

3,973,818

MULTI-PURPOSE PREFABRICATED ELECTRICAL INSTALLATION

Maurice Soquenne, Residence du Lac, 1 Esplanade de Collioure, 93330 Neuilly-sur-Marne, France

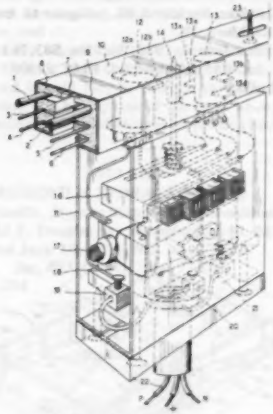
Filed Dec. 5, 1973, Ser. No. 422,091

Claims priority, application France, Dec. 7, 1972, 72.43495; Oct. 10, 1973, 73.36152

Int. Cl.² H01R 13/60

U.S. Cl. 339—22 B 4 Claims

1. An electrical supply device comprising an elongated duct adapted for fixing to a support surface, said duct including a sheath of channel-shaped cross section having a flat back, a pair of opposed side walls and a front opening, at least one insulating member housed in said sheath along one side wall thereof, said insulating member being provided with longitudinally extending slots, and at least one detachable adaptor which is adapted to be inserted through the opening where required along the duct for providing mechanically supported power supply connections for a piece of electrical equipment, two power conveying conductors and a plurality of auxiliary conductors fitted in said slots, said adaptor housing two further power conveying conductors and a plurality of further auxiliary conductors and having contact means for connecting said further power-conveying and further auxiliary conductors to the respective power-conveying and auxiliary conductors fitted in the slots; electrically controllable switching means for controlling the connection of the two further power-conveying conductors housed in the adaptor to said equipment, said switching means having a control terminal; further switching means for selectively controlling the connection between the respective further auxiliary conductors and the control terminal of said switching means and means for selectively applying



a control current to selected ones of the further auxiliary conductors, said contact means including at least one pivotable contactor having an axis which is perpendicular to the flat back of the sheath and is adapted for being fitted into the opening in the sheath, the said contactor having contact members adapted to be inserted simultaneously into the respective slots for making electrical connection with both the power-conveying and the auxiliary conductors when the contactor is pivoted.

3,973,819

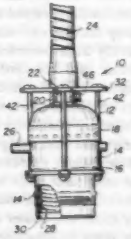
SOCKET CLAMP

Samuel G. Golub, Jackson Heights, and Charles E. Klagges, Lindenhurst, both of N.Y., assignors to Graham-Field Surgical Co., Inc., New Hyde Park, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,694

Int. Cl.² H01R 13/54

U.S. Cl. 339—209 1 Claim



1. A clamping device for a light socket wherein the socket is adapted for attachment to a goose neck stud and has a lower body part defined by a tapped nipple to thread onto the stud and an upper body part having a shouldered portion and which is frictionally retained in the lower body part.

said device including a reactive plate formed with a central aperture through which passes the stud for threaded engagement with the tapped nipple and against which the nipple reacts to lock said plate therebetween and the socket onto the goose neck,

a collar formed with a central aperture to seat on the shouldered portion of the upper body part,

and means to apply a compressive load between said collar and plate and thereby compressively lock the upper and lower body parts together, said means including a plurality of complementary bores in said collar and plate and connecting rod means received through an associated pair of said complementary bores to thereby compressively lock the upper and lower body parts.

3,973,820
TERMINAL POST CONNECTION ESPECIALLY FOR STORAGE BATTERIES

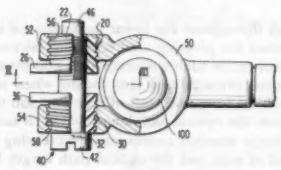
Anders Benson, Stockholm, Sweden, assignor to Aktiebolaget Tudor, Stockholm, Sweden

Filed Apr. 23, 1974, Ser. No. 463,417

Claims priority, application Sweden, Apr. 27, 1973, 7305940

Int. Cl.² H01R 11/26

U.S. Cl. 339—230 R **5 Claims**



1. Terminal connection apparatus for detachably connecting an electric cable to a terminal post comprising:

a stirrup joined with said cable and having spaced arms arranged to surround the sides of said terminal post; and

a clamping device located at free ends of the arms and arranged to engage with said free arm ends adapted to be located on opposite sides of said terminal post, said clamping device being placed under tension to press said arms toward each other to a locking position;

said clamping device comprising a first clamp element including a threaded member adapted for rotational movement relative to said arms to adjust the position between the ends of the arms and a second clamp element including a pair of externally threaded coaxial sleeves which are mounted on the threaded member and threadedly engage internal threaded bores in respective stirrup arms, said sleeves having radially projecting maneuvering arms for advancing said sleeves into or out of the respective stirrup arms, and the threads of one sleeve have a pitch opposite to that of the other sleeve.

3,973,821
CONNECTOR

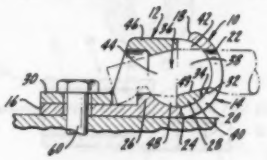
William J. Scott, and James F. Lucas, both of Sycamore, Ill., assignors to Ideal Industries, Inc., Sycamore, Ill.

Filed Nov. 29, 1974, Ser. No. 527,958

Int. Cl.² H01R 7/06

U.S. Cl. 339—266 R **7 Claims**

1. In a clamp connector for cables and the like, a ball and socket rotatably mounted with respect to each other with the ball in the socket, tails projecting from the ball and socket and adapted to be generally parallel of each other and in contact when the connector is closed and separated and somewhat divergent when the connector is open, the engaged surfaces between the ball and socket being noncircular and oriented so that the connector tends to stay in its open position, registrable apertures in the tails for joining the connector to a body and for rotating the ball within the socket, and openings disposed generally diametrically through the ball and socket



providing wire-distorting surfaces which are disposed to receive the stripped end of a wire when the connector is open and to be in wire-distorting position when the connector is closed.

3,973,822
TERMINAL APPARATUS

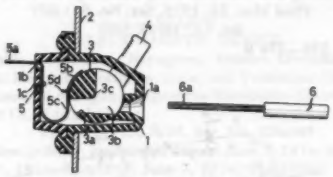
Yasuo Sugimoto, Musashino, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 3, 1974, Ser. No. 529,088

Claims priority, application Japan, Dec. 5, 1973, 48-140685

Int. Cl.² H01R 9/12

U.S. Cl. 339—274 **4 Claims**



1. A terminal apparatus used for connecting a lead wire to a terminal plate provided in a case, said terminal apparatus comprising:

a. a cylindrical rotor supported rotatably in said case having an operating knob, a hole for inserting said lead wire therethrough, and a substantially quadrantal slot formed in said cylindrical rotor adjacent to said hole and the corner formed by said hole and slot being used for holding said lead wire when it is in a lock state; and

b. a U-shaped terminal plate having a member of spring effect, said member being biased so as to contact with the surface of said rotor, the tip of said lead wire inserted through said hole being locked between said member and the surface of said rotor in response to its rotation.

3,973,823
ELECTRICAL TERMINAL CONNECTOR

Harris I. Stanback, Lexington, Ky., and Paul K. Campbell, Birmingham, Ala., assignors to Square D Company, Park Ridge, Ill.

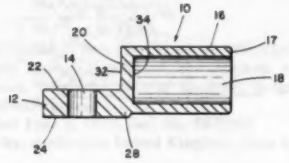
Filed Sept. 6, 1974, Ser. No. 503,888

Int. Cl.² H01R 5/10

U.S. Cl. 339—276 T **13 Claims**

1. A terminal connector for use as a termination for electrical cables and formable by an impacting process, the connector comprising a generally cylindrical tubular body portion having a longitudinal axis, one end closed by an end wall having a flat outer face, and an opening extending along the longitudinal axis inwardly from the other end for receiving an unsheathed end of a cable and terminating to define a flat

inner face of the end wall parallel to and closely spaced from the outer face, a pad extending outwardly from the closed end of the body portion and having an upper surface and a lower surface, the upper surface being disposed between a lower peripheral edge and the longitudinal axis of the body portion, an inner end face of the pad being disposed only between the



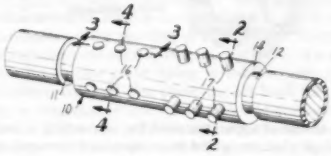
upper surface and the lower surface and toward the open end of the body portion from the closed end and substantially coplanar with the inner face of the closed end wall thereby to provide a terminal connector that has a minimum overall length, a body portion fully accessible for crimping, and a transitional section having a desired current carrying capacity with minimal metal waste.

3,973,824

MULTIPLE PENETRATION ALUMINUM CONNECTOR AND METHOD

Lawrence C. K. Chor, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 24, 1975, Ser. No. 561,027
Int. Cl.² H01R 5/00
U.S. Cl. 339—276 R **14 Claims**



1. A connector for a specified diameter aluminum conductor, comprising:

an aluminum sleeve with an internal cross-section close in shape and dimensions to the external cross-section of the conductor, and

at least one head pin retained on said sleeve and extending generally transversely thereform, said pin having a length of at least 80% but less the 130% of the wall thickness of said sleeve, there being a sufficient number of pins retained in a transverse cross-section that the total volume of sleeve material under the pins is at least equal to the void volume between the sleeve and the conductor.

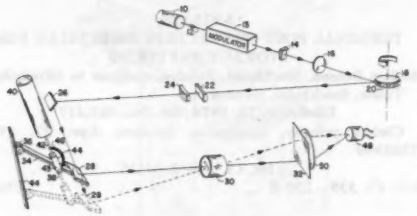
3,973,825

FLAT FIELD SCANNING SYSTEM

Gary Keith Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,639
Int. Cl.² G02B 27/17; G03G 15/28
U.S. Cl. 350—6 **19 Claims**

1. In a flat field scanning system: a source of illumination; a beam generated by said source; a scanning mirror; a stationary, generally planar member to be scanned; stationary imaging lens means optically located between said planar member and said scanning mirror; said scanning mirror being located between the object plane of said lens means and said lens means; scanning means located between said illumination source and said scanning mirror for scanning said beam across said mirror in an "X" direction; means mounting said scanning mirror for linear movement along a path transverse to said "X" direction and at an angle to said planar member from a start of scan position to an end of scan position to provide a scan of said beam in a "Y" direction generally perpendicular to said "X" direction; said scanning mirror at the start of scan position reflecting said scanned beam substantially on axis through said lens means to said planar member and at the end of scan position reflecting the same off axis through said lens means to said planar member to provide an "X" and "Y" scan of said beam onto said planar member; means for directing said beam to said scanning mirror along substantially the same



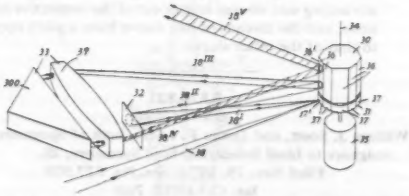
optical path throughout the linear movement of said scanning mirror; means for pivoting said scanning mirror during said linear movement in such a manner that said beam is continuously directed through said lens means when said scanning mirror is moved from said start of scan position to said end of scan position; the optical path length between said lens means and said planar member continuously increasing from start of scan to end of scan and the optical path length between said object plane and said lens means continuously increasing from start of scan to end of scan, by linear scanning movement of said scanning mirror, in substantially the same proportion that the optical path length between said lens means and said planar member increases; said planar member being located within the depth of focus of said lens means from start of scan to end of scan.

3,973,826

SCANNING DEVICES

Daniel Richard Lobb, Farnborough, England, assignor to Rediffon Limited, London, England

Division of Ser. No. 310,532, Nov. 29, 1972, abandoned. This application Dec. 26, 1974, Ser. No. 536,471
Claims priority, application United Kingdom, Jan. 25, 1972, 3429/72
Int. Cl.² G02B 27/17; H04N 3/00
U.S. Cl. 350—7 **4 Claims**



1. A device for scanning or deflecting a beam of radiation comprising a first rotatable body having at least one reflective surface on which the beam is initially incident and by which the beam of radiation is initially reflected; a static optical system disposed to receive the beam of radiation initially reflected from said first rotatable body and to reflect said

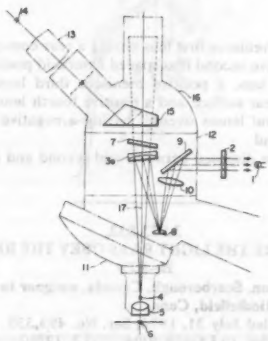
beam therefrom; and a second rotatable body having at least one reflective surface on which said beam reflected from said optical system is incident, and thereby, reflected, in which the second said rotatable body is a mirror drum of regular polygonal cross-section, having a plurality of mirror face facets, and is rotatable about its axis, and in which the first said rotatable body is a mirror drum of regular shape, having a plurality of curved convex mirror facets, and is rotatable about its axis.

3,973,827

INCIDENT LIGHT FLUORESCENCE MICROSCOPE

Toshifumi Uetake, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed July 20, 1973, Ser. No. 381,092
Claims priority, application Japan, July 23, 1972, 47-73702
Int. Cl.² G02B *21/16*
U.S. Cl. 350—91 **13 Claims**



1. An incident light fluorescence microscope comprising a light source means for generating an exciting illumination, an objective lens having an optical axis, an object position at which a fluorescent object on the objective optical axis on one side of said objective lens is positioned, a concave-type dichroic mirror positioned along the objective optical axis on the other side of the objective lens, said concave-type dichroic mirror being inclined at a relatively small angle with respect to the objective optical axis and reflecting means positioned adjacent the objective optical axis for reflecting the exciting illumination into said concave-type dichroic mirror at a relatively small angle with respect to the objective optical axis so that the angle of incidence is small, said dichroic mirror in turn reflecting the exciting illumination along the objective optical axis to excite the object to fluoresce, said concave-type dichroic mirror functioning to transmit the fluorescent light imaged on it from the object by the objective.

3,973,828

OPTICAL WAVE GUIDE

Seiichi Onoda, Tokorozawa; Mitsuo Tanaka, Ohme, and Katsuyuki Imoto, Sayama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 4, 1974, Ser. No. 476,311
Claims priority, application Japan, June 4, 1973, 48-61957
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 WG **5 Claims**

1. An optical waveguide through which light transmission is effected, consisting of:

a. a hollow cylindrically shaped light transmitting medium having a first prescribed index of refraction and a first prescribed thickness; and

b. a layer of light transmitting material surrounding and disposed on the outer surface of said cylindrically shaped light transmitting medium having an index of refraction slightly lower than that of said first index of refraction and

a thickness larger than that of said first prescribed thickness.

3,973,829

ELECTROCHROMIC DEVICES WITH PARTIALLY PRECHARGED COUNTERELECTRODES

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sept. 3, 1974, Ser. No. 503,022
Int. Cl.² G02F *1/17, 1/23*
U.S. Cl. 350—160 R **8 Claims**

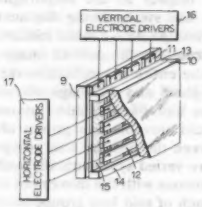
1. A variable light transmission device which comprises a persistent electrochromic material as a light modulating material, a counter-electrode, and an electrolyte material in contact with said light modulating material and said counter-electrode, wherein said counter-electrode includes electrochromic material in a substantially greater proportion than in said light modulating material and has a uniform predetermined partial electrical charge.

3,973,830

ELECTRO-OPTIC DEVICE

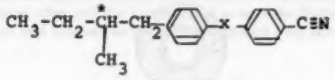
Masahide Tsukamoto, Neyagawa; Tetsuro Ohtsuka, Takatsuki; Kazuhisa Morimoto, Settu, and Yoshinobu Murakami, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 23, 1975, Ser. No. 570,961
Claims priority, application Japan, June 7, 1974, 49-65290; June 7, 1974, 49-65292; June 7, 1974, 49-65293
Int. Cl.² G02F *1/13;* C09K *3/34*
U.S. Cl. 350—160 LC **5 Claims**



1. In an electro-optical matrix display device having a cell containing a liquid crystal composition exhibiting a cholesteric to nematic phase transition upon applied voltage, which cell comprises two light-transparent opposed plates having a plurality of strip-shaped electrodes on the inner surfaces thereof, the direction of the strip electrodes on one of said plates intersecting that of the strip electrodes on the other said plate so as to provide a plurality of display elements at the intersections, the strip electrodes on at least one of said inner surfaces being transparent, and a spacer between said opposed electrodes; and a power supply coupled to said electrodes for applying an electric voltage to said electrodes, the improvement wherein the liquid crystal composition in said cell between said electrodes comprising 99.9 to 30 wt.% of at least one liquid crystal selected from the group consisting of nematic liquid crystals and cholesteric liquid crystals, and 0.1 to

70 wt.% of at least one optically active compound of the formula:



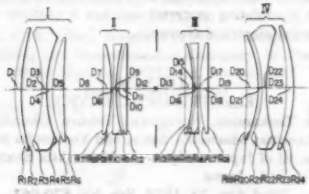
wherein X is CH=N, —N=N— or [—N—N—]

3,973,831

SYMMETRICAL LENS SYSTEM AFFORDING VARIABLE MAGNIFICATION

Kazuo Minoura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 349,542, April, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,887
Claims priority, application Japan, Apr. 17, 1972, 47-37668
Int. Cl.² G02B *15/00, 9/00*
U.S. Cl. 350—184 **5 Claims**



1. A varifocal lens system comprising a diaphragm, a pair of movable lens groups located so as to be axially symmetrical with respect to the diaphragm and a pair of stationary lens groups located between said movable lens groups and also symmetrical with respect to the diaphragm, and simultaneously the entire lens system being displaced as a unit in a subordinate relationship relative to the movement of the movable lens groups to satisfy the correct image-forming conditions throughout the entire magnification range while maintaining an object plane and an image plane stationary at a fixed axial distance and wherein said stationary lens groups are positive and said movable lens groups are negative, and the distances between the positive lens groups and the negative lens groups are varied symmetrically with respect to the diaphragm simultaneous with the movement of the entire lens system, wherein each of said lens groups have nearly equivalent absolute values of power and are composed of three lens members, said central lens member in each group being negative and said outer lens members in each group being positive.

3,973,832

RETRO-FOCUS TYPE WIDE ANGLE LENS SYSTEM

Toshinobu Ogura, Tondabayashi, and Akiyoshi Nakamura, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

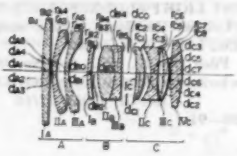
Filed Jan. 25, 1974, Ser. No. 436,763
Claims priority, application Japan, Jan. 30, 1973, 48-11571
Int. Cl.² G02B *9/62, 9/64*
U.S. Cl. 350—214 **6 Claims**

1. A retro-focus wide angle lens system comprising:

a first component which is located on the object side, has a negative refractive power and consists consecutively from the front to the rear of a positive lens, a negative meniscus lens having a rear concave surface and a negative meniscus lens having a rear concave surface;

a second component rearward of said first component and consisting from the front to the rear of a positive meniscus lens having a rear concave surface and a biconvex lens formed by a cemented doublet;

a third component rearward of said second component and consisting consecutively from the front to the rear of a



positive meniscus first lens having a rear convex surface, a biconcave second lens spaced from said positive meniscus first lens, a positive meniscus third lens having a convex rear surface and a positive fourth lens, said first and second lenses over-all having a negative refractive power; and

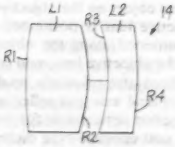
a diaphragm disposed between said second and third components.

3,973,833

LENS WHERE THE LIGHT RAYS OBEY THE RELATION H=KFθ

John A. Lawson, Scarborough, Canada, assignor to Zygo Corporation, Middlefield, Conn.

Filed July 31, 1974, Ser. No. 493,339
Int. Cl.² G02B *9/04, 27/17, 17/00*
U.S. Cl. 350—232 **3 Claims**



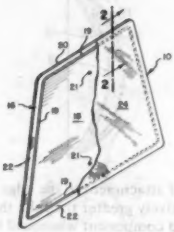
1. A lens adapted to transmit an angularly varying beam of light originating from a point on the optical axis thereof and essentially at a focal point of said lens in a path parallel to the optical axis of said lens on the image side thereof, said lens having a predetermined focal length F, the angle between the incident beam and the optical axis of the lens being θ and the height of the image beam from the optical axis being H, said quantities bearing a relationship $H = K F\theta$, said lens from the angularly varying light source consisting of a first bi-convex element and a second concave-convex element having its image side surface defined on a greater radius than its object surface and the axial spacing between said lenses on the optical axis being between two and ten percent of the equivalent focal length of the overall lens, and the curvature of the facing surfaces of the lens elements are equal to or greater than 0.30 of the equivalent focal length of said lens and equal to or less than 0.37 of the equivalent focal length of said lens, and K is approximately unity, the index of refraction of both of said lens elements referred to the D-line of sodium being greater than 1.6, whereby coma is introduced into said lens and said lens is taken out of the sine condition.

3,973,834

MIRRORS HAVING STRETCHED REFLECTIVE SHEET MATERIALS AND METHOD AND APPARATUS FOR THEIR PRODUCTION

Franklin E. Penn, Darien, Conn.; Walter B. Fletcher, Bedford, N.H.; Edmund Rosa, Lowell, Mass., and Joseph Perina, Huntington, N.Y., assignors to American Velcro, Inc., New York, N.Y.

Filed Mar. 26, 1974, Ser. No. 455,024
Int. Cl.[2] G02B *5/08*; E04B *1/00*
U.S. Cl. 350—310 16 Claims



1. A planar mirror having a reflective surface formed by a metallized thin-film reflective sheet material in a stretched condition over a supporting frame consisting of:

a. a unitary frame member having a rearward side portion and a forward side portion;

b. a raised integral peripheral ridge extending upwardly from the forward side portion thereof and defining an endless path, said ridge being positioned inwardly of the peripheral edge portion of said frame member so as to define a forward substantially flat peripheral marginal surface portion generally parallel to the frame portion surrounded by the peripheral ridge and extending about said frame member outwardly of, and in adjacent relation to said endless peripheral ridge;

c. a metallized thin-film reflective sheet material positioned over the forward side portion of the frame member and extending at least to peripheral edge portions thereof, at least a portion of said material being in a stretched condition across the frame portion defined by the peripheral ridge to thereby form a reflective mirror surface; and

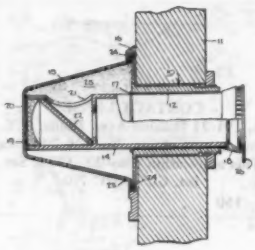
d. an elastomeric adhesive material positioned between the reflective thin-film sheet material and the forward peripheral marginal surface portion and extending from said peripheral ridge at least to said peripheral edge portion of said frame member and having a thickness at the peripheral edge portion greater than the thickness at the peripheral edge so as to maintain the stretched condition of the reflective thin-film sheet material with substantially uniformly distributed stresses therein being maintained in balanced equilibrium with reaction forces of the unitary frame member thereby creating a generally continuous and optically correct reflecting mirror surface at least over the frame portion defined by the peripheral ridge, while the elastomeric properties of said adhesive material permit expansion and contraction of the frame member and thin-film sheet material without substantial distortion of the reflecting mirror surface.

3,973,835

SECURITY VIEWING DEVICE

Jimmie Miyakawa, 7 Asbury Lane, Matawan, N.J. 07747, and Donald E. Degnan, 400 Madison Ave., New York, N.Y. 10017

Filed May 5, 1975, Ser. No. 574,692
Int. Cl.[2] G02B *25/04*
U.S. Cl. 350—319 7 Claims



1. A security viewing device comprising:

a housing;

an axially extending periscope rotatably mounted in said housing, said periscope including an axially facing eye piece at one end, an axially facing viewing port at the opposite end, and a radially facing viewing port adjacent said opposite end of said periscope;

a one-way reflecting surface fixedly mounted in said periscope, said reflecting surface positioned in inclined relation to said radially facing viewing port to reflect light rays entering radially through said radially facing viewing port in an axial direction toward said eye piece, said reflecting surface allowing light rays to pass axially therethrough from said axially facing viewing port to said eye piece; and

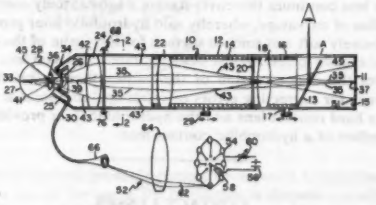
a cover mounted over said opposite end of said periscope and including a darkened area to prevent passage of light rays to said radially facing viewing port when said latter port is facing said darkened area.

3,973,836

REDUCED GLARE SCANNER

Jacques P. Govignon, Malden, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Dec. 2, 1974, Ser. No. 528,740
Int. Cl.[2] A61B *3/14*
U.S. Cl. 351—7 30 Claims



1. Apparatus for reduced glare observation of an article through transparent, reflective and diffusive media comprising, an image receiving means; illumination means which beams light to said article, said media being mounted proximate said article, said light being reflected from said article through said media to said image receiving means; light directing means to direct said light to rapidly and repeatedly illumi-

nate successive portions of said article; an observation diaphragm positioned between at least a portion of said media and said image receiving means, said diaphragm having a moveable aperture for moving in concert with said light directing means so as to rapidly scan the sequentially illuminated portions of said article, the remainder of said diaphragm screening out glare and means for moving said light directing means and said diaphragm aperture in synchronization.

3,973,837

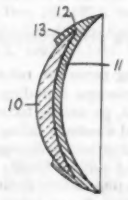
CONTACT LENSES

Louis J. Page, 191-21 Hillside Ave., Hollis, N.Y. 11423

Continuation-in-part of Ser. No. 140,200, May 4, 1971, abandoned. This application May 23, 1973, Ser. No. 363,186

Int. Cl.² G02C 7/04

U.S. Cl. 351—160 **11 Claims**



1. A corneal type contact lens made of a relatively firm optical material, said lens being of such a size to cover the major portion of the cornea and limited to an area within the cornea, the front surface being convex and the surface toward the cornea concavely formed to suitably fit thereon, the front and rear surfaces of said lens, at the peripheral edge portion tapering toward each other forming an acute angle situated within the limits of the cornea, means for providing a liner for said lens, said liner being made of a hydrophilic material and arranged to extend along the concave surface of the lens and continued over and beyond the edge portion thereof in a continuous and integral form, and the front surface dimension of the hydrophilic liner extending over and beyond the edge portion of said lens being relatively smaller than the dimension of the diameter of the front surface of the lens, and the arc of the convex surface of the hydrophilic liner extending from the peripheral edge portion thereon toward the peripheral edge of the lens continues thereover having a substantially continuous radius of curvature, whereby said hydrophilic liner provides a relatively soft and smooth surface for the tissue of the cornea and eyelids to rest against when hydrated, and said lens re-surfaces the major portion of the cornea thereby providing a means for correcting errors of refraction comparable to that of a hard contact lens and the hydrophilic liner providing the comfort of a hydrophilic contact lens.

3,973,838

CONTACT LENSES

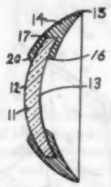
Louis J. Page, 191-21 Hillside Ave., Hollis, N.Y. 11423

Continuation-in-part of Ser. No. 140,200, May 4, 1971, abandoned. This application June 5, 1973, Ser. No. 367,348

Int. Cl.² G02C 7/04

U.S. Cl. 351—160 **7 Claims**

1. A corneal type contact lens having at least two components, one of said components being made of a relatively hard optical material and provided with suitable convex and concave refractive surfaces, the concave surface thereof being arranged to face the cornea of the eye and having a substantially continuous radius of curvature to the peripheral edge thereof, and of such a size to cover the major portion of the cornea, and having the surfaces of the hard component at the peripheral edge portion thereof substantially spaced from each other thereby forming a relatively blunt, thick edge surface which extends from the convex surface to the concave surface, thereby providing one of the supporting surfaces for the following described hydrophilic component, the other of said components being made of a hydrophilic material and arranged to extend partially over at least one of the refractive surfaces of said hard component in the form of a peripheral ring or border and continued over and directly across the edge portion of the hard component to the opposite surface thereof so that the dimensional thickness of the hydrophilic compo-



nent at the point of attachment to the edge portion of the hard component is relatively greater than the thickness of the edge portion of the hard component when said hydrophilic component is dehydrated, so that said ring rests on the cornea when worn, said hydrophilic component being continued therefrom extending radially and continuously around the edge portion thereof in the form of a skirt, the posterior surface of said hydrophilic ring projecting relatively rearwardly of the concave surface of said hard component when dehydrated, so that the exposed central area of the hard component is spaced at a relatively maximum distance from the surface of the cornea when worn, and the hydrophilic component is hydrated, said hard component being provided with the specified prescription, thereby providing the visual efficiency of the hard type contact lens and the hydrophilic component providing the comfort of the hydrophilic type contact lens.

3,973,839

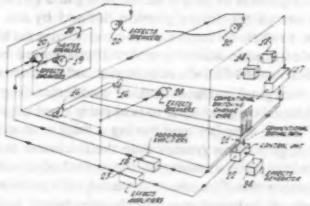
SPECIAL EFFECTS GENERATION AND CONTROL SYSTEM FOR MOTION PICTURES

Richard J. Stumpf, Woodland Hills; Waldon O. Watson, Universal City, and Robert J. Leonard, Northridge, all of Calif., assignors to MCA Systems, Inc., Universal City, Calif.

Filed Dec. 30, 1974, Ser. No. 537,194

Int. Cl.² G03B 31/00

U.S. Cl. 352—5 **29 Claims**



3. A method of simulating the physiological and psychological sensation of earthquake movements in an audience in a theater during a motion picture performance, said method comprising the steps of:

generating electrical signals with frequencies and transients simulating an earthquake and having components in at least the infrasonic frequency range;

amplifying said signals to sufficient power levels for inducing the desired sensation in the audience; and

selectively applying said amplified signals to at least one speaker system located in said theater during preselected portions of said motion picture performance and in synchronism with said motion picture.

3,973,840

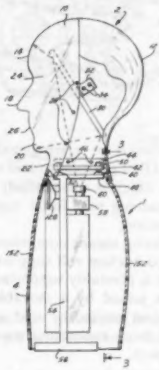
MANNEQUIN

G. Richard Jacobs, Salt Lake City; Cluff Peck, Kearns, and Dean G. Soderquist, Salt Lake City, all of Utah, assignors to Corporation of the President of The Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah

Filed Sept. 3, 1974, Ser. No. 502,805

Int. Cl.² G03B *21/32*

U.S. Cl. 352—86 **17 Claims**



1. A mannequin comprising a first part forming a hollow head and neck, a second part forming a hollow torso, a three dimensional rear projection screen forming the face part of said head having well defined forehead, nose, cheeks and chin and smooth poorly defined eye and mouth areas, means inside said torso for projecting motion pictures of facial features including well defined eye and mouth parts that correspond in size at the screen to said face part from inside said torso through the hollow neck into said hollow head, means in said hollow head for reflecting said motion pictures onto said screen without correction for three dimensional effects to give the illusion of life thereto, and means for moving said head relative to said torso to locate the projection of said well defined eye and mouth parts properly on said poorly defined eye and mouth areas.

3,973,841

MOTION PICTURE CAMERA WITH DISSOLVE MECHANISM

Rolf Gehlert, Munich, and Friedrich Winkler, Unterhaching, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

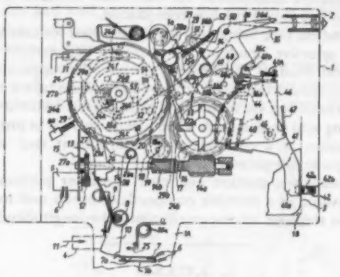
Filed July 14, 1975, Ser. No. 595,680

Claims priority, application Germany, July 17, 1974, 2434352

Int. Cl.² G03B *21/36*

U.S. Cl. 352—91 C **22 Claims**

1. In a motion picture camera, particularly in a camera for use with 8mm film, a combination comprising a housing; film transporting means in said housing; a prime mover mounted in said housing and being operable to actuate said film transporting means; a mechanism for making exposures with dissolve, including a program member having an annulus of teeth and being rotatable from a starting position through one revolution to thereby effect the exposure of a predetermined number of film frames with fade-out, rearward transport of said frames and the exposure of said frames with fade-in, said annulus having a gap and said mechanism being mounted in said housing and further including an advancing device receiving motion from said prime mover to perform a movement along a predetermined path including said gap in said starting



position of said program member, and at least one auxiliary tooth rotatable with said program member and being movable into and from said gap; and actuating means for temporarily moving said auxiliary tooth into said gap at the will of the operator so as to enable said advancing device to move said program member from said starting position whereupon said device cooperates with the teeth of said annulus to rotate said program member.

3,973,842

MAGAZINE FOR SLIDES FOR THE SIMULTANEOUS PROJECTION OF PICTURES AND REPRODUCTION OF SOUND

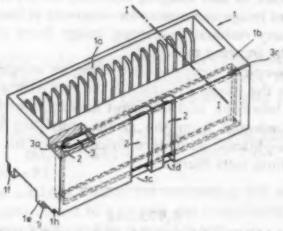
Hans Woerner, Calmbach, Black Forest, Germany, assignor to Pronton-Werk Alfred Gauthier GmbH, Wildbad, Germany

Continuation of Ser. No. 383,114, July 27, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,619

Claims priority, application Germany, July 29, 1972, 2237390

Int. Cl.² G03B *31/06*; G11B *25/04*, *23/02*

U.S. Cl. 353—19 **15 Claims**



1. Self-contained, portable compact composite longitudinal magazine carrier for use in the projection of diapositives with simultaneous concordant reproduction of associated sound upon intermittent stepwise advancement of the magazine carrier along a longitudinal path in a projection and sound reproduction apparatus, which comprises:

a longitudinal picture slide magazine portion provided with means defining a plurality of compartments in tandem longitudinally for operatively receiving diapositives respectively in generally parallel arrangement in a stored position therein for individual movement from such

stored position to a projection position in accordance with such stepwise advancement, and

a longitudinal sound tape container portion provided with an endless sound carrier means formed as a separate longitudinally extending endless tape and guided for movement along an endless path for carrying a plurality of endless sound tracks with each sound track corresponding to a dispositive so that upon projection of the respective diapositives the associated sound of a corresponding sound track is reproduced,

said endless tape being operatively disposed for corresponding selective simultaneous operative engagement with a sound head of such sound reproduction apparatus and associated drive means to drive the endless tape for sound reproduction via such sound head during such movement along said endless path when a diapositive is in projection position at a corresponding intermittent step of such stepwise advancement, and

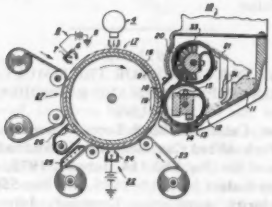
said magazine portion and tape container portion being provided as a portable compact composite unit for common stepwise advancement along the longitudinal path.

3,973,843

ELECTROSTATOGRAPHIC IMAGING APPARATUS

Nero R. Lindblad, Palmyra; Gordon E. Johnson, Webster, and James H. Sharp, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 3, 1972, Ser. No. 277,544
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **8 Claims**



1. In an electrostatographic apparatus having an imaging member, means for forming a latent electrostatic image on the imaging surface of said imaging member, means for developing said latent image and means for removing at least a portion of at least any residual developed image from the imaging surface of the imaging member;

the improvement comprises providing an imaging member wherein the imaging surface is treated with an adherent film of lubricant, said lubricant having at least one compound selected from the group consisting of phthalic acid, isophthalic acid, terephthalic acid, the metal and ammonium salts thereof.

3,973,844

LATCHING MECHANISM FOR THE BACKUP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS

Alan F. McCarroll, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 28, 1974, Ser. No. 473,847
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **11 Claims**

1. Fuser apparatus for utilization in fixing toner images to copy sheets, said apparatus comprising:

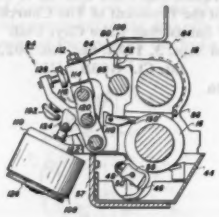
a heated fuser roll structure;

a backup roll forming a nip with said fuser roll structure through which copy sheets move with said toner images contacting said heated fuser roll structure;

means supporting said backup roll for rotation adjacent said fuser roll structure and permitting movement of said backup roll into engagement with said fuser roll structure in disengagement therefrom;

force transmitting means operative between a first position where said backup roll is first brought into engagement with said fuser roll structure and a second position where said backup roll is depressed by said fuser roll structure to form said nip; and

force generating means operatively coupled to said backup roll support means via said force transmitting means for



applying a first force for moving said force transmitting means from said first position to said second position and a second force which is substantially less than said first force for maintaining said force transmitting means in said second position;

said force transmitting means comprising a three-link linkage wherein said backup roll support constitutes one of said links which is pivotably supported and the other two links which are joined by a movable pivot operatively connecting a pivot carried by said support with a fixed pivot; and said force generating means is connected to said movable pivot.

3,973,845

METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES

Nero R. Lindblad, Palmyra; Henry R. Till, Rochester, and Charles L. Beatty, Brighton, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 15, 1975, Ser. No. 541,350
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 **5 Claims**

1. In an apparatus for removing toner from a moving imaging surface comprising:

an imaging surface arranged for movement;

blade means which does not require the use of a lubricant for removing toner from said imaging surface, said blade means having a blade surface defining an edge; and

means for supporting said blade means with said edge pressed against said imaging surface for removing said toner;

the improvement wherein, said apparatus further includes:

means for providing a seal between said blade edge and said imaging surface for preventing toner from passing said blade and for reducing friction between said blade and

said imaging surface, said seal means comprising substantially spherical particles which are sufficiently rigid to resist deformation when pressed against said imaging surface, said particles being embedded in said blade to substantially cover said edge with segments of said particles protruding from said blade surface.

3,973,846

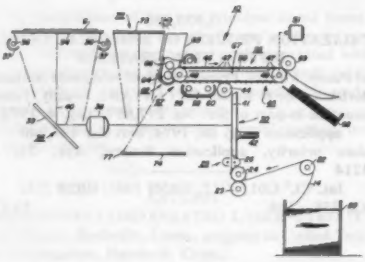
ELECTROSTATIC MASTER MAKING APPARATUS

William A. Sullivan, Webster; James R. Cassano, Penfield, and David O. Kingsland, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 25, 1974, Ser. No. 508,922

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 **5 Claims**



5. In an apparatus for producing masters on a charged photosensitive web for later use as a source for copies; the combination of:

a. means forming a first station for exposing said web to an original whereby to form a latent electrostatic image of the original thereon;

b. means forming a second station for developing said web whereby to render the latent electrostatic image thereon visible;

c. means forming a third station for viewing the developed images on said web whereby corrections of the developed images may be made before fusing of the image;

d. means forming a fourth station for fusing images developed on said web whereby to provide permanent images for use as masters; and

e. means for moving said web from station to station; said web being comprised of a zinc oxide material.

3,973,847

PRODUCTION OF GRAPHIC PATTERNS

Hans-Rudolf Gygax, Bottighofen, and György Peregi, Neuhausen, Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed July 8, 1974, Ser. No. 486,474

Claims priority, application Germany, Aug. 13, 1973, 2340961

Int. Cl.² G03B *27/04*

U.S. Cl. 355—85 **2 Claims**

1. A device for producing graphic patterns such as inscriptions on a substrate covered with a light-sensitive layer, in particular on an oxidized aluminum sheet or on an oxidized aluminum foil secured to a plastic support film, whereby the substrate is illuminated through a master pattern which has areas transparent to UV light, comprising

an illuminating unit including an ultraviolet light source and a holding frame operable to press the master pattern onto the substrate and to hold the pattern and the substrate in position to be exposed to illumination from said light source;

a developing tank including a spraying device and being operable to treat the exposed substrate by spraying developer from said spraying device onto the substrate;

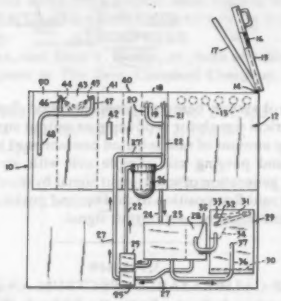
a first storage tank for storing used developer;

a first pump operably connected between said spraying device and said first tank for delivering used developer to said spraying device at predetermined time intervals;

a second storage tank for storing fresh developer;

a second pump operably connected between said spraying device and said second tank for delivering fresh developer to said spraying device at predetermined time sequences as required;

a distillation chamber structure connected to said first storage tank and including a heating device to vaporize the developer from said first storage tank, a cooling device to



condense the vaporized developer, and having a collecting channel for the condensate connected to said second storage tank, whereby used developer from said first storage tank is distilled and thereafter delivered to said second storage tank;

an etching tank including a heater and a thermostat device cooperating for maintaining a liquid etchant in said etching tank at a predetermined temperature;

a drying tank positioned between said developing tank and said etching tank and operable for drying the substrate after treatment in the developing tank;

a water holding tank for rinsing said substrate; and

a stripping tank operable for receiving and holding a solvent for the part of the light-sensitive layer hardened by the light.

3,973,848

AUTOMATIC GAS ANALYSIS AND PURGING SYSTEM

Terence W. Jowett, Avon, and Thomas A. Cross, Winsted, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 19, 1974, Ser. No. 534,525

Int. Cl.² G01N *21/34*; G01V *1/04*

U.S. Cl. 356—51 **1 Claim**

1. A gas analysis system for measuring the amount of a selected contaminant in a sample gas comprising:

a sample cell adapted to contain a gas;

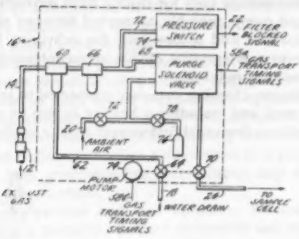
means for generating a beam of infrared radiation;

a solenoid valve having first and second positions;

means for passing air through said solenoid valve to said sample cell when said valve is in said first position and passing said sample gas through said solenoid valve to said sample cell when said valve is in said second position;

means including a data control system for moving said valve between said first and second positions, to first purge said sample cell with air and to thereafter remove the air and fill said sample cell with the sample gas, and for passing said beam through said sample cell during the time that said cell contains air and producing a first electrical signal

indicative of the absorption of said radiation by the selected contaminant in said air, and for passing said beam through said sample cell during the time that said cell contains said sample gas and producing a second electrical signal indicative of the absorption of said radiation by the selected contaminant in said sample gas, said data



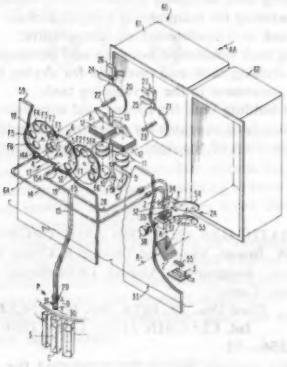
control system being responsive to said first and second electrical signals for producing an output signal indicative of the amount of said selected contaminant in said sample gas and purging said sample cell with air immediately after generation of said output signal by moving said valve from said first position to said second position in response to generation of said output signal.

3,973,849

SELF-CALIBRATABLE SPECTRUM ANALYZER

Ralph Newton Jackson, Endicott; Richard Wilhelm Kern, Vestal, and Alvin Hu Tong, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 16, 1975, Ser. No. 587,459
Int. Cl.² G01J *3/42*
U.S. Cl. 356—97 **14 Claims**



1. Spectral analyzer apparatus comprising:

a source of radiation for providing at least one beam of radiation having a predetermined spectral bandwidth characteristic;

spectral band image converter means for providing a spectral image of said beam;

plural optical electrical detectors disposed in an array, said detectors of said array being electrically scannable in a predetermined sequence,

means for selectively irradiating said array of detectors with at least two portions of said spectral image, one of said portions being associated with a predetermined first spectral range, the other of said portions being associated with a predetermined second spectral range, said first and second ranges including mutually exclusive first and second spectral components, respectively, said first and second ranges having a common spectral component intermediate of said first and second spectral components, and

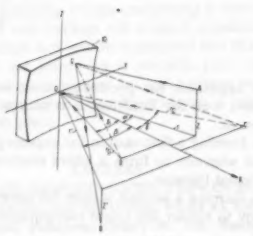
means for calibrating said detectors for said first and second ranges, said means for calibrating including at least first and second narrow band optical filters and means for disposing said first and second filters in a predetermined manner in said radiation beam, said first and second filters being single and double narrow bandpass types, respectively, said first fitler having a spectral transmission characteristic corresponding to one of the three said spectral components and said second filter having a spectral transmission characteristic corresponding to the other two said spectral components.

3,973,850

FOCALIZATION PROCESS OF SPHERICAL CONCAVE DIFFRACTION GRATINGS

Michel Pouey, Vanves, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly, France

Continuation-in-part of Ser. No. 277,857, Aug. 4, 1972. This application Aug. 16, 1974, Ser. No. 497,940
Claims priority, application France, Apr. 21, 1972, 72.14214
Int. Cl.² G01J *3/12*; G03H *1/04*; G02B *5/32*
U.S. Cl. 356—100 **14 Claims**



1. The method of making a monochromator using a concave, reflective holographic grating, which comprises the steps of:

a. determining the physical parameters of the monochromator by using a concave classical reflective diffraction grating having straight, parallel lines which are equidistantly spaced to provide a line density $1/n$, a height H_0 and a width W_0, the monochromator having fixed entrance and exit slits with the grating being mounted for rotation only with respect to said slits whereby to scan a spectral range of interest, said physical parameters being the positions of said entrance and exit slits with respect to the intersection of their optical axes at the center of the reflective surface of said grating, and said physical parameters being selected to provide a defect of focus which balances second order aberration terms excepting astigmatism whereby the partial derivative $\delta F_1/\delta w$ is equal to zero, F_1 being the optical path associated with said classical grating and w and h being Cartesian coordinates with respect to said center of the grating extending respectively perpendicular and parallel to said grating lines;

b. holographically forming a grating by locating two point sources of monochromatic light of wavelength λ_0 in the w plane passing through the center of a holographic blank having the concavity of said classical grating, such that said point sources are located by four position parameters which are the respective distances rc and rd of said point sources from said center of the holographic blank and the angles γ and η which lines from such point sources to said

center respectively make with a line passing through such center and normal to said holographic blank, said four position parameters being established by four simultaneous equations the first of which is $\sin\eta - \sin\gamma = n\gamma_0$ and the remaining three of which are determined on the basis of

$$\frac{\delta F_2}{\delta w} = 0$$

and

$$\frac{\delta P}{\delta h} = \frac{\delta F_1}{\delta h} + \frac{\delta F_2}{\delta h} = 0$$

and by cancelation of the two principal coma terms associated with the coma contribution of said point sources, F_1 as before being the optical path associated with said classical grating and F_2 being the optical path relative to said entrance and exit slits associated with said holographically formed grating; and

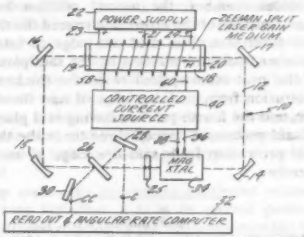
substituting the holographically formed grating for said classical grating.

3,973,851

DISPERSION COMPENSATED LASER GYRO (U)

Carl M. Ferrar, Rockville, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 29, 1973, Ser. No. 347,581
Int. Cl.[2] G01B 9/02; H01S 3/05
U.S. Cl. 356—106 LR **2 Claims**



1. A laser gyro comprising:

a closed loop optical cavity including a plurality of mirrors defining an optical path;

a laser gain medium disposed in said optical path, said laser gain medium having a gain versus frequency profile and a related dispersion profile having its zero point substantially at the frequency of maximum gain of the frequency versus gain profile with which it is associated;

a directional bias means disposed in the optical path of said optical cavity for providing a directional bias resulting in a frequency difference between waves circulating in one direction in said optical cavity and waves circulating in the other direction in said optical cavity, said bias being equivalent to at least the largest angular rate to be sensed by said laser gyro;

Zeeman Effect means providing a magnetic field within said laser gain medium oriented parallel to the waves circulating through said laser gain medium, said Zeeman Effect means providing two distinct gain versus frequency profiles in said laser gain medium, with two distinct corresponding dispersion profiles, said magnetic field having a magnitude to cause a frequency difference between the frequency of maximum gain of said two gain versus frequency profiles which is equal to the frequency difference between counter-rotating waves caused by said directional anisotropy means, the magnetic field of said Zeeman Effect means being related to the polarity of said directional anisotropy means so as to cause counter-rotating waves supported by each of said gain versus frequency profiles to be at substantially equal dispersion points on the related dispersion profiles;

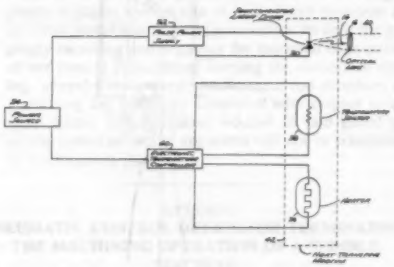
means for extracting the clockwise and counterclockwise waves from said cavity and for providing an output manifestation of angular rate of said laser gyro as a function of frequency difference between said clockwise and counterclockwise waves.

3,973,852

METHOD AND APPARATUS FOR MEASURING PARTICULATE CONCENTRATION IN THE ATMOSPHERE

Zack J. Moore, and John V. Goode, Jr., both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 30, 1974, Ser. No. 501,933
Int. Cl.[2] G01N 21/12, 21/26
U.S. Cl. 356—207 **13 Claims**



1. A portable transmissometer for measuring particulate concentration in the atmosphere over a distance of from about 0.1 ft. to about 5000 ft. comprising a semiconductor laser light diode which emits monochromatic laser light pulses of intense irradiance and uniform energy magnitude when pulsed by a uniform current pulse and when the temperature of the diode is the same at the beginning of each pulse with the wavelength of said laser light pulses lying within one of the essentially non-absorbing wavelength windows of the atmosphere;

a pulse power supply which current pulses the laser diode at a rate of from about 10 pulses per second to about 1000 pulses per second, with the current pulses, and the corresponding light pulses produced by the diode, having a half-peak width of from about 1 nonosecond to about 500 nonoseconds;

a temperature controlling means to have the laser diode at the same temperature at the beginning of each pulse,

an optical lens located at such a distance from the laser diode so that its focal point is located at the laser diode so as to collimate the uncollimated laser light pulses, with such pulses being directed through the atmosphere to be measured for particulate concentration toward a receiver, with such receiver having a light filtering means which responds only to light having wavelengths nearly the same as that of the wavelengths of the monochromatic laser pulses emitted by the laser diode; and said receiver having a linear semiconductor detector diode having a linear dynamic response to the light impinging upon it over a range of at least 6 decades as part of the receiver's electronic circuit;

said semiconductor detector diode causing a small voltate to appear at the input of a voltage amplifying circuit to which the diode is A-C coupled;

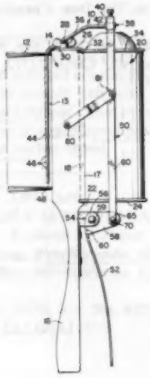
said amplifying circuit amplifying said voltage pulse sufficiently to produce voltage pulses capable of triggering a monostable multivibrator which produces a voltage pulse of a fixed amount of energy each time such a voltage pulse if produced with said monostable multivibrator produced voltage pulses capable of being handled by a peak detector circuit electrically connected to the monostable multivibrator's output; the voltage output of the peak detector circuit being the signal to a suitable recording device.

3,973,853

HAND HELD AEROSOL CAN APPLICATION

Gene Edward Myers, Miami, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed May 29, 1975, Ser. No. 581,869
Int. Cl.[2] A46B *11/02*
U.S. Cl. 401—190 3 Claims



1. An applicator apparatus for an aerosol can having a top mounted valve and nozzle means said applicator comprising a head portion merging into an elongated handle portion, said head portion having a front face carrying plural upstanding members selected from the group consisting of comb teeth and brush bristles, said head portion having a back surface, opposite said front face, forming a cradle for said aerosol can, aperture means on said front surface between said upstanding members, conduit means having one end connected to said aperture means and having an opposite end adapted to be connected to said valve and nozzle means, and linkage means including a lever extending along said handle portion and making an acute angle therewith for depressing said valve and nozzle means in response to angular movement of said lever.

3,973,854

CONNECTORS FOR TUBULAR FRAMING MEMBERS

Charles F. Gilbo, and Alan S. Glassman, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed May 23, 1975, Ser. No. 580,204
Int. Cl.[2] F16B *7/00*; F16D *1/00, 3/00*
U.S. Cl. 403—170 5 Claims

1. Components capable of assembly into furniture and room units comprising:

a. support members, each having sockets in the ends thereof,

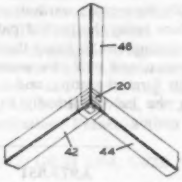
b. joint components comprising:

1. a body member which is sized to be inserted into the socket of a support member and held frictionally thereby,

2. an apertured means extending from said body member and receiving a connecting element, said apertured means being of the same configuration as the cross-section of said support member and having its aperture axis at a 90° angle relative to the axis of said support member, said apertured means being a protusion, the plane of which is extending substantially perpendicular from said body member, said protrusion having its shaped configuration in the above-said plane, and said protrusion having a thickness across the above-said plane of one quarter the dimension of said shaped configuration and said thickness is also equal to one quarter the cross-sectional dimension of the support member,

3. a shoulder member between said body member and said apertured means,

c. and a connecting element passing through said apertured means for fastening together a plurality of support members having joint components fastened thereto, and



d. the improvement comprisng positioning of the protrusion in its above-said plane at selected points relative one side of the support member,

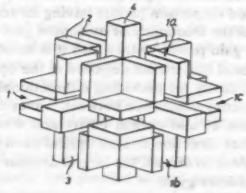
1. said selected points being any one of four positions, the first one of which having one planar surface of said protrusion in the plane containing one edge of said shoulder member, the second position having said planar surface of the protrusion spaced the thickness of said protrusion from said one edge of said shoulder member, the third position having said planar surface of the protrusion spaced twice the thickness of said protrusion from said one edge of said shoulder member, and the fourth position having said planar surface of said protrusion spaced three times the thickness of said protrusion from said one edge of said shoulder member.

3,973,855

CONNECTING DEVICE FOR PANELS AND TUBES

Edwin Florence, Bromley, England, assignor to Edwin Florence, Limited, England

Filed Apr. 30, 1975, Ser. No. 573,053
Int. Cl.[2] F16B *13/00*
U.S. Cl. 403—171 4 Claims



1. A connector for joining at least three tubes and for supporting at least two panels in a rectangular structure, said connector comprising a body having at least three pins, each for engaging the inside of a tube and each extending from said body in a direction perpendicular to another pin, and a recess between each pair of mutually perpendicular pins for receiv-

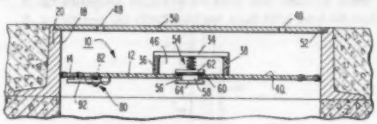
ing a corner of a panel, said recess being defined by opposed parallel surfaces of a pair of spaced panel-engaging members and each of said members having a pair of tube-engaging surfaces each for abutting with the outside of a tube fitted to one of the pins of said pair of mutually-perpendicular pins.

3,973,856

MANHOLE CLOSURE ASSEMBLY

Joseph Gaglioti, 1602 Conchester Road, Boothwyn, Pa. 19061

Filed June 17, 1975, Ser. No. 587,592
Int. Cl.² E02D *29/14*
U.S. Cl. 404—25 **18 Claims**



14. The manhole closure assembly comprising:

A. a retaining ring adapted to be secured within a manhole opening, an inner periphery of said retaining ring defining a central opening therethrough;

B. a removable cover plate having opposed upper and lower surfaces, said cover plate being adapted to seat against the retaining ring for sealing off the opening through said retaining ring; the improvement comprising

C. a plurality of locking assemblies for locking the removable cover plate to the retaining ring, each locking assembly comprising:

a rotatable, threaded actuating member extending through an opening in the cover plate adjacent a side margin thereof;

a laterally extending locking lug retained on a lower section of the actuating member and rotatable with said actuating member, whereby rotation of the actuating member in one direction will cause the locking lug to move from a first position completely underlying the cover plate to a second position in which a section thereof underlies the retaining ring;

a biasing means disposed between a lower surface of the cover plate and an upper surface of the locking lug to normally bias said locking lug in a downward direction; and

a stop means for preventing continued rotation of the locking lug when it is in its second position during continued rotation of the actuating member in said one direction, whereby said continued rotation moves the locking lug in an upward, linear direction relative to the actuating member to frictionally seat against a lower surface of the retaining ring to lock the cover plate to said retaining ring.

3,973,857

GUARD RING MOUNTING FOR CEMENT FINISHER APPARATUS

Marvin E. Whiteman, Jr., Saugus, Calif., assignor to Whiteman Manufacturing Company, Pacoima, Calif.

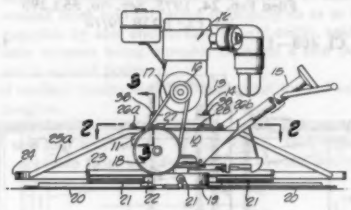
Continuation of Ser. No. 393,803, Sept. 4, 1973, abandoned. This application Feb. 4, 1975, Ser. No. 547,027
Int. Cl.² E01C *19/22*
U.S. Cl. 404—112 **2 Claims**

1. In cement finishing apparatus having a main frame structure operatively mounting a plurality of rotatable finishing trowel blades, and power driving means having a mounting base portion, the improvement comprising:

a. an upper plate member rigidly supported on said main frame;

b. means for rigidly supporting the power means on said main frame with its base portion in spaced relation to said upper plate member, including a plurality of tubular spacer members respectively receiving an anchor stud bolt;

c. a guard ring for said finishing blades carried by the outer ends of circumferentially spaced rod members, said rod members at their inner ends being connected with a central plate means positioned in the space between said power means base portion and said upper plate member, and having enlarged openings for respectively coaxially surrounding said spacer members; and



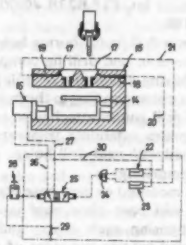
d. a plurality of axially compressed cylindrical grommets of resilient material respectively having a central bore grippingly engaged around one of said spacer members and an outer peripheral groove intermediate its ends for grippingly receiving and engaging the marginal edge portion of the central plate means forming the associated opening, whereby the central plate means, rod members and guard ring are resiliently supported with respect to said main frame, and vibrations induced in said guard ring during operation of the apparatus will not be transmitted to the finishing blades.

3,973,858

PNEUMATIC CONTROL DEVICE FOR TERMINATING THE MACHINING OPERATION OF A SPINDLE MACHINE

Bernard Poisson, and Guy Steydlé, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of France

Filed June 12, 1975, Ser. No. 586,219
Claims priority, application France, June 14, 1974, 74.20759
Int. Cl.² B23B *39/04*, *49/00*
U.S. Cl. 408—11 **7 Claims**



1. A pneumatic control device for terminating the machining operation of a machine tool having a spindle comprising, in combination, a sleeve disposed in surrounding relationship with the tool end of the spindle, a front seal on the forward end of said sleeve, said front seal being engageable in sealing relationship with a workpiece or a jig accommodating a workpiece to form therewith a closed, sealed chamber having an inner wall at the end of the machining operation, a port in said chamber inner wall, supply means for introducing compressed

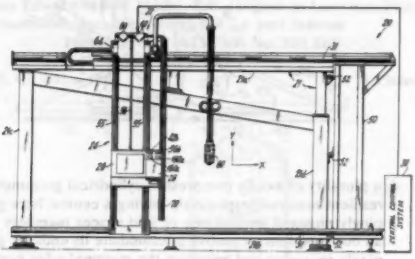
air into said chamber, conduit means connected to said port for exhausting the compressed air from said chamber and a pneumatic receiver connected to said exhaust conduit means for controlling the end of the machining operation.

3,973,859

AUTOMATED DRILLING SYSTEM

John G. Huber, Sayville, and William B. Grauer, Babylon, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,295
Int. Cl.² B23B *39/14*
U.S. Cl. 408—12 **12 Claims**



1. A machine tool manipulator arrangement comprising: a manipulator head; said manipulator head including a cylindrical member positioned in the Z direction and defining an annular piston on the outer surface thereof, said cylindrical member carrying an axially located spherical bearing at one end; a tool detachably secured to said spherical bearing at its working end; means for rotating said tool in said bearing within a predetermined range, said rotating means being located at the opposite end of said cylindrical member; means defining an annular cylinder, said piston being slidably positioned within said annular cylinder, and means for directing pressurized fluid to said annular cylinder to cause said cylindrical member to move in said Z direction.

3,973,860

CLAMPING DRILL JIGS ON SKIS

Walter J. Kern, Riverside, R.I., assignor to Austrian Ski and Machine Corporation, Cranston, R.I.

Filed Apr. 16, 1974, Ser. No. 461,272
Int. Cl.² B23B *49/00*
U.S. Cl. 408—108 **3 Claims**

1. A clamp for a drill jig for boring holes in a ski for mounting a binding thereon, said drill jig comprising

a base plate having a plurality of drill holes therethrough, said drill holes corresponding to the holes of a binding, and

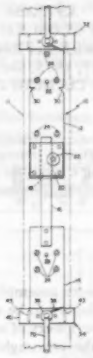
a plurality of drill guides attached to said base plate, said drill guides extending transversely from said plate and aligned with said drill holes,

said clamp comprising:

a pair of jaws mounted on said base plate and movable with respect to said base plate, said jaws having inner face portions opposing each other, and said face portions being adapted to grip the sides of a ski, each said jaw having a rack portion,

means for biasing said jaws toward a first closed position for securing a ski to said base plate with said drill guides and drill holes aligned with said ski for boring therethrough comprising a torsion spring having a pair of end legs,

means for overcoming said biasing selectively to move said jaws to a second open position in which a ski can be inserted before boring and removed thereafter comprising a cap with a retaining portion and an arm, the major portion of said spring being contained within said cap, one leg of said torsion spring being engaged by said retaining portion and the other leg of said spring extending outside said cap to engage said base plate, and



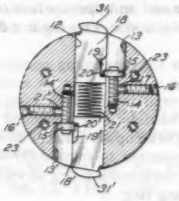
a pinion, said pinion being rotatable by said biasing means and by said overcoming means, said pinion being engageable with said rack portion so that said pinion can move said jaws between said first and second positions.

3,973,861

DEBURRING TOOL

Reiner W. Süssmuth, Neu Isenburg, Germany, assignor to Amtel, Inc., Providence, R.I.

Filed Feb. 12, 1975, Ser. No. 549,326
Claims priority, application Germany, Feb. 15, 1974, 2407269
Int. Cl.² B23D *77/02*
U.S. Cl. 408—154 **3 Claims**



1. A deburring tool having a cylindrical body, a guide slot extending diametrically across the body, a pair of cutter blades having cutting edges received in line in said slot, said blades being radially outward and inward displaceable, spring means acting between the blades to displace them radially outward, each blade having abutment means thereon for engagement with means in said body to limit the outward displacement of the blades.

3,973,862

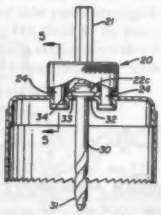
PILOT DRILL LOCATING MEANS FOR HOLE SAW ASSEMBLY

Fred Segal, 545 Fairhill Drive, Akron, Ohio 44313

Filed June 2, 1975, Ser. No. 583,203
Int. Cl.² B23B *51/04*
U.S. Cl. 408—204 **3 Claims**

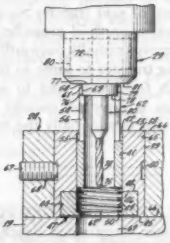
1. A hole saw assembly comprising:

A. an arbor having
1. a body portion with opposed first and second faces, and
2. a spindle projecting from said first face,
B. a cylindrical cutting member having
1. a base with a rearwardly presented planar face,
2. a cylindrical body secured to said base, and
3. cutting teeth on the forward edge of said body;
C. locking and driving means carried by said arbor for engaging said base of said cutting member and drawing said base into flush contact with said second planar face of said arbor;
D. a pilot, drill having
1. an elongate shank with first and second ends,
2. a cutting tip disposed on said first end of said shank, and



3. an axially and radially extending locating sleeve disposed on said second end of said shank;
E. said second face of said arbor having a blind recess therein, with said recess having a configuration and depth dimension substantially complemental to the configuration and depth dimension of said locating sleeve;
F. said base of said cutting member having a through aperture therein for reception of said shank of said pilot drill; and
G. said locating sleeve being received in said recess in said second face of said arbor and being trapped between said second face of said arbor and said rearwardly presented face of said cutting member against axial and rotational movement with respect thereto upon actuation of said locking and driving means.

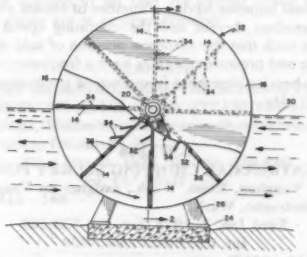
3,973,863
DRILL CHANGING DEVICE
Joseph E. Smith, Torrance, Calif., assignor to Excellon Industries, Torrance, Calif.
Filed Jan. 10, 1975, Ser. No. 540,232
Int. Cl.[2] B23Q *3/157*
U.S. Cl. 408—241 R **11 Claims**



1. In combination with a drilling machine having a collet having an end surface, and a drill having a shank at one end and a cutting tip at the opposite end, a device for allowing said collet to selectively engage said shank for a drilling operation, and to remove said shank from said collet, comprising

a collar on said shank,
said collar having a surface adjacent said tip and having a surface remote from said tip spaced a predetermined distance from said tip,
and holding means for holding said collar and positioning said drill in a predetermined position alignable with said collet, said holding means including
a movable element engaging said collar, said movable element having an abutment means engaged by said surface of said collar adjacent said tip for thereby axially positioning said drill, said surface of said collar remote from said tip facing outwardly so as to be engageable by said end surface of said collet, said movable element being movable between a first position and a second position,
and resilient means biasing said element toward said first position,
whereby when said surface of said collar is so engaged by said end surface of said collet, said element is movable from said first position toward said second position.

3,973,864
TIDE MOTOR
Dewitt T. Atherton, 407 West E St., Encinitas, Calif. 92024
Filed Jan. 24, 1975, Ser. No. 543,685
Int. Cl.[2] F03B *7/00, 13/12*
U.S. Cl. 415—8 **1 Claim**



1. A wave motor comprising:
a. a pair of rotors having spaced coaxial axles;
b. each of said rotors having a plurality of radially extended paddle elements and each of said paddle elements being provided with a plurality of apertures;
c. each of said apertures having a blade dimensioned to cover same and hingedly connected to the respective paddle adjacent the respective aperture and radially inwardly thereof;
d. all of the blades of one of said rotors being hinged to one angular side of the paddle elements and all of the blades of the other of said rotors being hinged to the opposite angular side of the paddles opposite;
e. each of said axles having one end thereof adjacent the other of said axles and each of these adjacent ends having a bevel gear journalled therein;
f. a power take-off shaft disposed between said rotors and perpendicular to the axles thereof and having a bevel gear engaging the bevel gear on said axles; and
g. each of said axles having a right ratchet wheel mounted thereon adjacent the bevel gear thereon, and each of the bevel gears on said axles having a pawl engaging the respective ratchet wheel such that each ratchet wheel engages the respective pawl when the rotor on the respective axle is turning in the angular direction opposite to the angular side to which the blades thereon are attached, whereby said power take-off shaft will be activated by one of said rotors when turning in one direction and the other of said rotors when turning in the opposite direction.

3,973,865

SIDE-CHANNEL RING COMPRESSOR

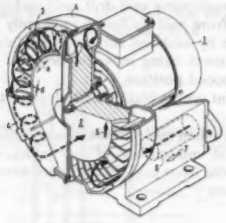
Kurt Mugele, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 23, 1975, Ser. No. 543,542

Claims priority, application Germany, Feb. 7, 1974, 2405890

Int. Cl.² F04D 5/00

U.S. Cl. 415—53 T 3 Claims



1. In a side-channel ring compressor for pumping a gaseous medium including an intake opening through which said medium enters said compressor, and a pressure opening out of which said medium leaves said compressor, the improvement comprising an impeller for pumping said medium and conducting said medium from said intake opening to said pressure opening, said impeller having a number of blades z chosen so that the product thereof and the operating speed n of the impeller is such that the vibration maxima of said medium at said intake and pressure openings have a frequency which lies above the hearing threshold frequency of the human ear and below 100 kHz.

3,973,866

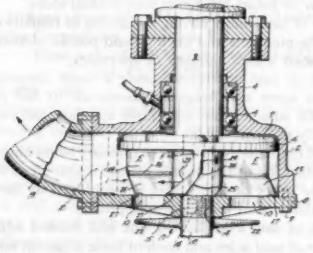
CENTRIFUGAL CHOPPING SLURRY PUMP

James E. Vaughan, Elma, Wash., assignor to Vaughan Co., Inc., Montesano, Wash.

Filed Jan. 2, 1975, Ser. No. 538,169

Int. Cl.² F04D 1/04, 7/04

U.S. Cl. 415—121 B 5 Claims



1. A centrifugal chopping slurry pump, comprising a runner having a runner blade with a substantially radial cutting edge, a casing housing said runner and having an intake wall with an intake port spaced radially from the axis of said runner and traversed by said substantially radial cutting edge of said runner blade in cutting relationship to an edge of said intake port, and a screw propeller connected to said runner for rotation about the runner axis, located at the side of said casing intake wall opposite said runner and spaced from said casing intake wall, the leading edge of the tip portion of each screw propeller blade being sharp to slice and reduce the size of material for passage through said intake port and said tip portion being swept back abruptly relative to the remainder of the blade for displacing away from said intake port objects not reduced in size sufficiently as to be capable of passing through said intake port, and the blades of said screw propeller having a pitch for producing a booster current toward said intake port to assist in feeding material toward and through said intake port to said runner blade having its cutting edge in cutting relationship to said intake port.

3,973,867

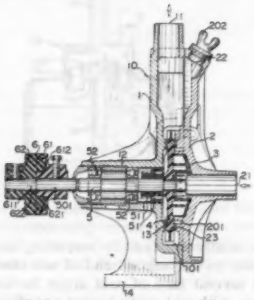
RADIAL FLOW TYPE PUMP

Chien Fu Lee, 152-2, Lane 90, Yen Ping Road, Chung Li, Taiwan, China

Filed Apr. 9, 1975, Ser. No. 566,221

Int. Cl.² F04D 1/02

U.S. Cl. 415—143 10 Claims



1. A fluid pump comprising:

a pump casing having defined therein a fluid inlet and a fluid outlet;

a rotatable drive shaft rotatably connected to said casing and rotatably driven by a motor;

a main fluid propeller of the regenerative type mounted on said drive shaft in said casing to be rotatable therewith and in fluid communication with said outlet;

an auxiliary fluid propeller of the centrifugal type mounted on said drive shaft for rotation therewith, said auxiliary fluid propeller being located between said fluid inlet and said main fluid propeller, said auxiliary propeller having fluid guiding means positioned thereon to receive fluid from said fluid inlet and guide it radially outwardly of said main fluid propeller for substantially the entire length of said fluid guiding means; and

fluid transfer means located circumferentially about said guiding means and in fluid communication with said fluid guiding means and located on said pump casing to receive fluid from said fluid guiding means and guide it radially outwardly of said main fluid propeller over substantially the entire length of said transfer means for transferring said fluid to said main fluid propeller in a manner such that said fluid moves radially outwardly of said main fluid propeller during transfer to same so that fluid movement on a fluid path from said inlet to said outlet via said propeller means is directed radially outwardly of said main propeller for substantially the entire length of said fluid path.

3,973,868

SUCTION VALVE FOR SUBMERGED PUMPING SYSTEM

German Louis Weisser, Huntington Beach, Calif., assignor to Fairchild Industries Inc., Germantown, Md.

Filed Sept. 20, 1974, Ser. No. 507,752

Int. Cl.² F04D 27/00

U.S. Cl. 415—157 5 Claims

1. A cryogenic pump and motor unit adapted for lowering through a cryogenic fluid transmitting conduit to pump cryo-

genic fluid through the conduit wherein the improvement comprises:

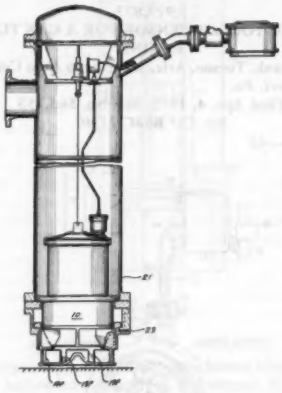
a motor housing of smaller diameter than the conduit,

a pump housing arranged with the motor housing and having a discharge outlet surrounding the motor housing to discharge fluid into the conduit around the motor housing,

a motor in the motor housing having a shaft extending through said pump housing,

impeller means on the motor shaft arranged with the pump housing to pump fluid therethrough to the discharge outlet,

valve means for controlling the flow of fluid from outside of the fluid transmitting conduit into the pump housing, the valve means comprising a movable fluid control member having a closed end exposed to the fluid to be pumped and a plurality of side ports arranged close to the bottom end for allowing the fluid to be pumped to pass into the pump housing and a stationary valve member coaxial with the fluid control member and coacting therewith for



controlling the flow of the fluid to be pumped into the pump housing in accordance with the relative position of the side ports relative to the stationary valve member, the fluid control member being normally arranged in an open position to allow the fluid to be pumped to pass into the pump housing and movable to a closed position where the ports are sealed off by the stationary valve member thereby preventing the fluid to be pumped to pass into the pump housing, the fluid control member further comprising a cylinder closed at its bottom end and having a flange portion at its upper end, said stationary valve member being constructed and defined to receive the flanged portion of the fluid control member for coaction therewith and having a fluid port for conveying a gas between the coacting surfaces of the valve members whereby the fluid control member is caused to glide up within the stationary valve member in response to the application of a pressurized gas at the fluid port, and

pneumatic means for producing relative movement between the valve members.

3,973,869

TURBINE IN-TAKE BAFFLES

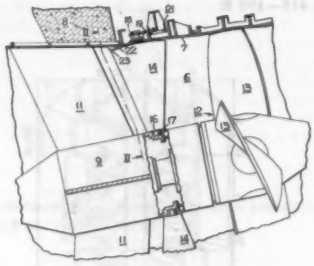
Duane E. Doll, and Douglas H. Baker, both of York, Pa., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 28, 1975, Ser. No. 626,280

Int. Cl.² F01D *17/00*

U.S. Cl. 415—160 **1 Claim**

1. A hydraulic turbine comprising: a water confining passageway; a turbine runner supported in said passageway for rotation about an axis; a set of circumferentially spaced and aligned runner blade vanes connected to said runner and extending radially therefrom; a set of circumferentially spaced and aligned wicket gate vanes supported in said passageway and disposed in a radial direction about said runner axis, at least one of said sets of vanes being rotatable about a radial



axis between extreme positions to open and close said passageway, said rotatable vanes when in an open position defining a vee-shaped space between the peripheral edge of said vanes and said passageway; and a plurality of baffles connected to said passageway, said baffles having a configuration and being located to fill said vee-shaped space when said rotatable vanes are in an open position.

3,973,870

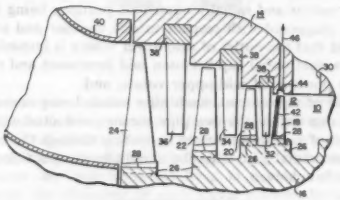
INTERNAL MOISTURE REMOVAL SCHEME FOR LOW PRESSURE AXIAL FLOW STEAM TURBINE

Kirit J. Desai, Media, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 4, 1974, Ser. No. 520,830

Int. Cl.² F01D *25/32*

U.S. Cl. 415—168 **4 Claims**



1. An axial flow turbine apparatus comprising:

a casing having a slot circumferentially disposed about the interior surface thereof for the removal of moisture,

a rotor member rotatably supported within said casing,

a rotatable blade mounted on said rotor member for rotation therewith, said rotatable blade having a convex surface, a concave surface, a leading edge and a trailing edge thereon,

a radially extending groove disposed on said concave surface adjacent to said trailing edge in radial alignment with said slot,

an axially extending ridge disposed on said concave surface, said ridge terminating adjacent to said groove,

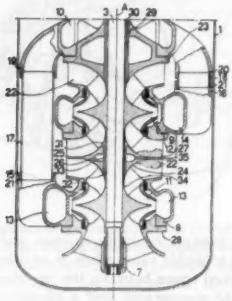
said ridge adapted to guide moisture droplets carried by a motive fluid and deposited on said concave surface into said groove,

said groove adapted to conduct moisture droplets guided thereinto by said ridge into said circumferentially extending slot in said casing.

3,973,871
SUMP PUMP

Pierre G. Hance, La Louviere, Belgium, assignor to Ateliers de Constructions Electriques de Charlerol (ACEC), Charlerol, Belgium

Filed Oct. 25, 1974, Ser. No. 518,175
Claims priority, application Belgium, Oct. 26, 1973, 806614
Int. Cl.² F04D *29/28*
U.S. Cl. 415—198 R **4 Claims**



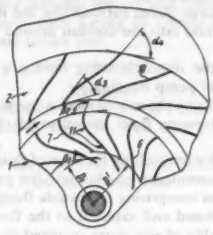
1. A sump pump comprising:
a. a sump casing;
b. a single vertical driving shaft in said sump casing;
c. an upper impeller and a lower impeller, said impellers being mounted in vertically spaced disposition on said shaft, each impeller having a pair of intake means;
d. an upper volute and lower volute, each volute surrounding one impeller, each volute being of a spirally, radially, outwardly extending configuration with a radially innermost portion, a radially outermost portion and a radial gap between said innermost and outermost portions;
e. at least one outlet in the radially outermost portion of each volute;
f. said outlets and radially outermost portions being angularly staggered with respect to one another and so disposed that the outlet of said lower volute is immediately below said radial gap between said innermost and outermost portions of said upper volute; and
g. a pair of pipe means, each pipe means being connected with one outlet, the one pipe means connected with the outlet of said lower volute extending through the region of said radial gap; whereby a radially compact arrangement is achieved.

3,973,872
CENTRIFUGAL COMPRESSOR

Konstantin Pavlovich Seleznev, ulitsa Politekhnicheskaya, 29, kv. 91; Jury Borisovich Galerkin, ulitsa Vavilovykh, 11, korpus 3, kv. 125; Leonid Yakovlevich Strizhak, ulitsa Vavilovykh, 11, korpus 3, kv. 128, and Anatoly Vasilievich Zuev, ulitsa Galstyana, 38, kv. 94, all of Leningrad, U.S.S.R.

Filed Aug. 1, 1975, Ser. No. 600,972
Int. Cl.² F04D *29/44*
U.S. Cl. 415—211 **4 Claims**

1. A centrifugal compressor comprising: an impeller; a diffuser installed concentrically with said impeller; blades equispaced around the circumference of said impeller and forming channels, the ratio of the length of each blade along its pitch line to the main arithmetical width of said blade channel being equal to 3.8 – 5.6 and said blade being shaped in such a manner that in the zone between the entrance edge of said blade and its center in the radial direction the angle between the pitch line in the longitudinal section of said blade and the tangent line to an imaginary circle drawn through any point of said pitch line from the center of the axis of rotation of said impeller is equal to the entrance angle of said blade

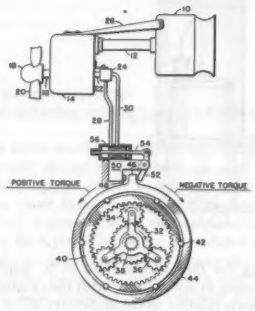


while in the remaining zone of said blade this angle varies according to a quadratic parabola.

3,973,873
NEGATIVE TORQUE SENSOR FOR A GAS TURBINE ENGINE

Wayne C. Shank, Tucson, Ariz., assignor to Avco Corporation, Williamsport, Pa.

Filed Apr. 4, 1975, Ser. No. 565,155
Int. Cl.² B64C *11/40*
U.S. Cl. 416—43 **8 Claims**



1. Negative torque sensing and propeller feathering apparatus for use on aircraft having a variable pitch propeller, said propeller feathering apparatus including both a mechanism for varying the pitch of said propeller and a source of oil pressure applied to said mechanism, the pressurizing of said source enabling the setting of the pitch of said propeller, said propeller returning to a feathered state when the pressure of said source is reduced below a predetermined level, said propeller being coupled to a gas turbine engine through planetary gearing including therein an input member, an output member and a rotatable reaction member, said torque sensing and feathering apparatus comprising:
an annular disk rotatably mounted concentric with the axis of said reaction member;
coupling means from said disk to said reaction member for transferring reaction forces to said disk in response to torque being applied to said planetary gearing, said coupling means including a torque indicator for providing instantaneous indications of torque applied to said planetary gearing;
means for providing an angular stop for said disk, said means providing reaction for said reaction member in response to positive torque applied to said planetary gearing from said engine;
means responsive to angular motion of said disk away from said positive stop in response to negative torque applied

to said output member from said propeller for rapidly reducing the pressure of said source below said predetermined level for altering the pitch of said propeller to its feathered position; and

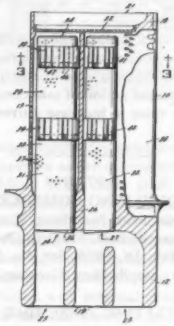
means responsive to a decrease in negative torque for automatically enabling the repressurizing of said source.

3,973,874

IMPINGEMENT BAFFLE COLLARS

Robert J. Corsmeier, and Bernard L. Koff, both of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Sept. 25, 1974, Ser. No. 509,032
Int. Cl.² F01D *5/18*
U.S. Cl. 416—97 A **6 Claims**



1. An improved rotatable turbomachinery blade of the type having a hollow cavity defining an internal wall surface, a thin-walled cooling insert having a plurality of cooling holes formed therein and adapted to be positioned within said cavity for the impingement of coolant on said internal wall surface, means for accurately positioning said insert with respect to said wall surface and means for delivering coolant to the interior of said insert, wherein the improvement comprises: a wear element rigidly connected to said insert for frictionally engaging said internal wall surface and preventing direct frictional contact between said internal wall surface and said insert, said wear element surrounding a substantial chordwise portion of said insert and being constructed of alternate solid and scalloped portions, said solid portions providing lateral support of said insert within said cavity and said scalloped portions providing for the flow of cooling air between said insert and said internal wall surface.

3,973,875

TURBINE DISCS AND BLADES FOR GAS TURBINE ENGINES

Jack Raymond Bird, Chellaston, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Jan. 28, 1975, Ser. No. 544,769
Claims priority, application United Kingdom, Feb. 9, 1974, 6004/74
Int. Cl.² F01D *5/28*
U.S. Cl. 416—241 B **5 Claims**

1. A rotor for a bladed gas turbine engine, the rotor including a hub portion comprising an outer shell formed from hot pressed silicon nitride and at least one heat resistant insert which substantially fills the space within the shell and which has a lower strength then said shell, said heat resistant insert being attached to the shell, the shell being formed by two shell portions, and each of said shell portions having a thickness

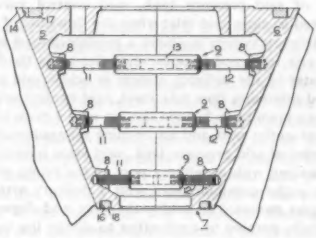
which is substantially constant in a direction parallel to an axis about which the rotor is rotatable.

3,973,876

RUNNER HUB CONSTRUCTION FOR PROPELLER TYPE TURBINE

Paul J. Eyster, and Edward J. Yanek, both of York, Pa., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 13, 1974, Ser. No. 523,547
Int. Cl.² F03B *3/12*
U.S. Cl. 416—244 A **1 Claim**



1. A runner hub for a hydraulic turbine comprising: a pair of arcuate hub segments constructed and arranged to be assembled together to form an annular hollow truncated cone-shaped hub having oppositely disposed end surfaces, the joint between said hub segments lying in a plane which passes through the diameter of each circle defined by said cone-shaped hub; at least one runner blade rigidly connected to and extending radially from each hub segment; a first and second pair of axially spaced internally threaded bosses on the interior surface of each segment, the bosses of each pair being circumferentially spaced from one another, said bosses being arranged in opposite facing alignment with one another when said segments are in the assembled position; a rod threaded at each end threadably received in each boss and extending inwardly of said hub, the inner end of each rod being aligned and adjacent to the inner end of a complementary rod, the threads on the adjacent rod ends being of a different hand; a hollow cylinder having an internal thread at each end thereof of a different hand, each cylinder being threadably received on complementary threads of adjacent rod ends, said rods and attached cylinders extending substantially diameterically across said hub transverse to said hub segment joint, said cylinders being adjustable to forceably pull and hold said segments in mating engagement; walls defining an annular groove in each end surface; and a shrink ring contained in each groove to hold said runner segments in the assembled position.

3,973,877

AUTOMATIC PUMPING DEVICE

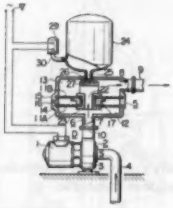
Tomohiko Taki, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 26, 1974, Ser. No. 527,229

Claims priority, application Japan, Nov. 30, 1973, 48-133506

Int. Cl.² F04B 49/00

U.S. Cl. 417—38 8 Claims



1. An automatic pumping device comprising:
a. a pump;
b. a pressure tank maintained in communication with a delivery system of said pump;
c. a pressure switch adapted to sense the internal pressure of said pressure tank and to effect control of starting and stopping of said pump; and
d. a control valve mounted in the delivery system of said pump for effecting control of opening and closing of an inlet of said pressure tank, said control valve being adapted to close said inlet when the flow rate of water in the delivery system is above a predetermined minimum flow rate level and to open said inlet when the flow rate of water in the delivery system is below said predetermined minimum flow rate level, said control valve comprises a main body formed therein with a main inlet port, a main outlet port and an opening communicating with the inlet of said pressure tank, said main inlet port communicating with a delivery port of the pump while said main outlet communicates with a delivery system, diaphragms mounted in said main body and disposed substantially parallel to each other to divide the interior of said main body into an inlet chamber in which said main inlet port is formed and an outlet chamber in which said main outlet port is formed, said diaphragms defining therebetween an intermediate chamber, one of said diaphragms facing said outlet chamber having an effective pressure receiving area which is greater than the effective pressure receiving area of the other diaphragm facing said inlet chamber, an orifice held by said diaphragms for maintaining said inlet chamber and said outlet chamber in communication with each other, and a valve body held by said orifice adapted to open and close the inlet of the pressure tank.

3,973,878

METHOD AND DEVICE FOR ELECTROMAGNETIC PUMPING BY CONDUCTION OF LIQUID METALS HAVING LOW ELECTRICAL CONDUCTIVITY

Jean-Paul Le Frére, Villejuif, France, assignor to Groupement pour les Activities Atomiques et Avancees "GAAA", Le Plessis Robinson, France

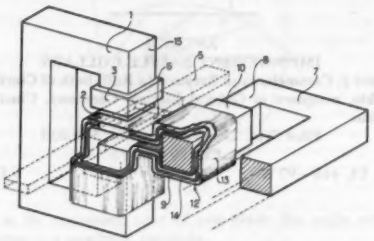
Filed Feb. 12, 1975, Ser. No. 549,261

Claims priority, application France, Feb. 21, 1974, 74.05958

Int. Cl.² H02N 4/20

U.S. Cl. 417—50 15 Claims

1. In an electromagnetic pumping method suitable for liquid metals having low electrical conductivity, consisting in flowing through a pumping duct liquid or molten metal simultaneously, passing an electrical current flowing in a direction perpendicular to the axis of the pumping duct and applying to the liquid or molten metal a magnetic field perpendicular to the axis of the pumping duct and to the conduction current and confining the conduction current which originates in a



conductive spire to a casing filled with the metal to be pumped, the improvement which comprises immersing a bar made of a material which is a good electrical conductor and immune to the chemical action of said conductive liquid metal in said conductive spire to increase current flow in said conductive spire.

3,973,879

LIQUID RING COMPRESSOR

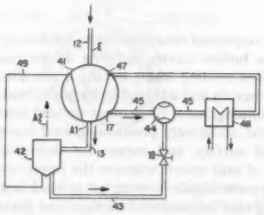
Claus Ramm, Stein near Nurnberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 18, 1975, Ser. No. 550,282

Claims priority, application Germany, Mar. 13, 1974, 2412095

Int. Cl.² F04C 19/00; F04B 23/04

U.S. Cl. 417—69 3 Claims



1. In a liquid ring compressor comprising
a. a stationary housing having a compressed gas outlet and a gas inlet;
b. an impeller disposed for rotation in the said housing and surrounded by a co-rotating eccentric liquid ring;
c. a liquid take-off point disposed within said housing at a position where it is acted upon by the liquid ring;
d. internal auxiliary liquid circuits in said compressor for sealing;
e. at least one external connecting line coupling said liquid take-off point to one of said internal auxiliary liquid circuit to thereby supply liquid from said ring to said internal auxiliary liquid circuit; and
f. a liquid separator for separating out liquid carried along with gas compressed by the compressor coupled to said gas outlet of said compressor, the improvement comprising:
g. a liquid jet pump having a suction input, a jet input and an output disposed in said at least one external connecting line with its jet input coupled to said liquid take-off point and its suction input coupled to the liquid output of said liquid separtor, whereby the liquid from said liquid

separator will be returned through said connecting line to the compressor.

3,973,880

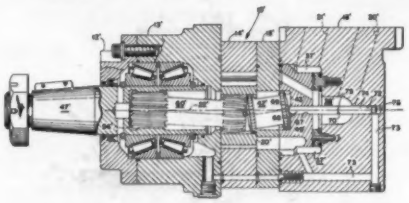
DRIVE CONNECTION MEANS FOR A HYDRAULIC DEVICE

Nils Einar Swedberg, Chanhassen, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 387,988, Aug. 13, 1973, Pat. No. 3,899,270. This application Apr. 18, 1975, Ser. No. 569,504

Int. Cl.² F01C *1/02*; F03C *3/00*; F16D *3/18*; F04C *1/02*

U.S. Cl. 418—61 B 8 Claims



1. Rotary apparatus comprising axial positioning means for spline teeth which operate as drive connection means between a rotating and orbiting main drive shaft and an externally toothed star member adapted to partake of hypocycloidal movement and between said main drive shaft and a rotatably fixed input-output shaft, said drive connection means including external, crowned spline teeth disposed about both end portions of said main drive shaft, one end portion of which is in splined drive relation with internal straight spline teeth in a central opening in said star member and the other end portion of which is in splined driving relation with internal straight spline teeth in a bore formed in said input-output shaft, said drive connection means subjected to varying bidirectional torque loading and said positioning means effective to develop a singular tooth wear pattern between internal and external spline teeth, said positioning means comprising:

a. abutment means at one end of said main drive shaft preventing movement of said main drive shaft in a first axial direction;

b. biasing means at the other end of said main drive shaft forcing said main drive shaft against said abutment means and preventing movement of said main drive shaft in an opposite axial direction, said biasing means maintaining said main drive shaft in a fixed axial position notwithstanding axial forces exerted on said main drive shaft by the magnitude and torque direction applied to said drive connection means;

c. said biasing means including plunger means operable to bias said main drive shaft; and

d. means providing fluid communication with said plunger means for biasing said plunger means into operation.

3,973,881

VANE-TYPE PUMP OR MOTOR WITH UNDERVANE FLUID BIAS

Wilhelm Melchinger, Unterensingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

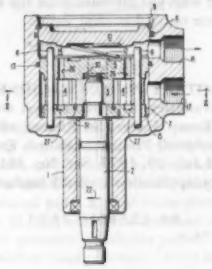
Filed Feb. 5, 1975, Ser. No. 547,165

Claims priority, application Germany, Feb. 6, 1974, 2405574; May 14, 1974, 2423474

Int. Cl.² F01C *21/00*; F03C *3/00*; F04C *15/00*

U.S. Cl. 418—81 32 Claims

1. A vane cell installation for liquid flow media which comprises a rotor means provided with at least approximately radial slot means, vane means slidable within said slot means, an endless cam surface means surrounding the rotor means and radially enclosing together with the rotor means at least one sickle-shaped working space means, the cam surface means having a radially outwardly directed inclination with respect to a circular surface concentric to the center of rotation of the rotor means which forms an inlet area during transversal of the cam surface means in a predetermined direction corresponding to the operating direction, and a corresponding radially inwardly directed inclination in at least one other circumferential area of the cam surface means forming a discharge area, two essentially plane base plate means axially sealingly enclosing on both sides the rotor means together with the vane means and the cam surface means and axially delimiting the working space means, internal connecting channel means connecting the inlet area of the working space means with a feed channel means and connecting the discharge area of the working space means with a discharge channel means, a working medium supply means



from a part of the system which is subjected to the higher pressure level, to bottoms of the slot means of the rotor means disposed in the inlet area by way of flooding channel means and a working medium discharge means out of the bottom of the slot means of the rotor means disposed in the discharge area toward the high pressure side of the installation by way of emptying channel means, characterized in that the working medium discharge means takes place exclusively by way of a by-pass means including at least a partial area of the axial extent of the bottoms of the slot means of the rotor means disposed in the inlet area, and in that the flooding channel means to said last-mentioned bottoms of the slot means terminates in said slot bottoms at an axial position thereof disposed downstream with respect to the connecting place of the emptying channel means, as viewed in the flow direction of the working medium discharge.

3,973,882

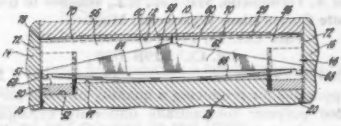
ROTARY COMBUSTION ENGINE APEX SEAL ARRANGEMENT

Frank J. Winchell, Orchard Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 17, 1975, Ser. No. 558,660

Int. Cl.² F01C *19/02*

U.S. Cl. 418—121 3 Claims



1. An apex seal arrangement for a rotary combustion engine having an inner peripheral wall and oppositely facing side walls and a rotor between the side walls with apexes that remain adjacent the peripheral wall to provide expansible gas chambers as the rotor rotates, said apex seal arrangement comprising a pair of apex seal segments positioned in a slot in

each rotor apex with oppositely facing inner ends and outer ends that face the respective side walls, said apex seal segments having a peripheral sealing surface on an outer side and an end sealing surface on the outer end and a ramp completely along an underneath side inclined relative to the peripheral wall and adjacent side wall, a central wedge positioned in the slot with a base facing the bottom of the slot and sides engaging said ramps on the respective apex seal segments so that when a radially outward force is applied to said wedge said sides operate on said ramps to urge said apex seal segments in directions bringing said peripheral sealing surfaces radially outward against the peripheral wall and said end sealing surfaces axially outward against the respective side walls whereby a leakage gap is left only between the oppositely facing inner ends of said apex seal segments radially outward of the slot, and a spring positioned in the slot for seating on the bottom of the slot and engaging said base of said central wedge to provide together with gas pressure from the chambers a radially outward force on said central wedge.

3,973,883
ROTARY PISTON MACHINES

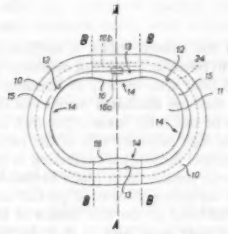
Robert Edwin Walmsley, Marlow; Robert Oliver, Wargrave, and Norman Ernest Fisher, St. Albans, all of England, assignors to Vandervell Products Limited, England

Filed July 20, 1973, Ser. No. 381,353

Claims priority, application United Kingdom, July 25, 1972, 34788/72

Int. Cl.² F01C *21/10*

U.S. Cl. 418—178 **11 Claims**



1. For use with a housing of a rotary piston machine which housing has a bore made up of a plurality of semi-cylindrical portions; liner means comprising at least two curved flexible metal strips each having an inner surface which, when each of the strips is located in a semi-cylindrical portion of the bore, has the shape of a lobe of a trochoidal surface, and means at the ends of each of said pair of metal strips to provide the inner surfaces thereof with re-entrant portions of the trochoidal surface.

3,973,884
MANUFACTURE OF HIGH-DENSITY FOAMED POLYMER

Michael A. Terminiello, Mahwah, N.J., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Oct. 23, 1974, Ser. No. 517,271

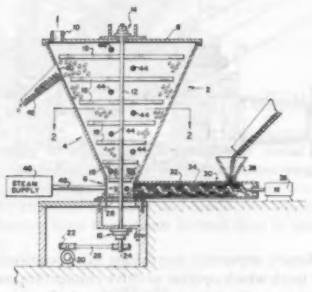
Int. Cl.² B29B *3/00*

U.S. Cl. 425—4 R **2 Claims**

1. Apparatus for producing a quantity of small particles of expanded polymer substantially uniformly expanded to a desnity on the order of one-half to one-thirteenth of its average density as unexpanded, said apparatus comprising, in combination,

a vessel having a first, lower, small-diameter portion in the form of a right cylinder and thereabove a second frustroconical portion having thereabove a top shell and having an interior in the form of a frustrum of an inverted cone having a base angle of 70° to 83°, said first portion having therein a feed opening and said second portion having therein a discharge opening, the effective height of said vessel from its bottom to said discharge opening being related to the diameter of the midsection of said frustroconical portion such that said midsection diameter is 0.5 to 1.1 times said effective height, said first portion having a diameter one-fifth to one-tenth that of said top shell,

means for feeding unexpanded particles of polymer and steam to said first portion of said vessel,



a central vertically extending shaft within said vessel and journaled for rotation about a vertical axis, said shaft having affixed to it a plurality of blade members extending outwardly therefrom towards and into close proximity to the walls of said vessel,

a plurality of stationary bar members mounted within said vessel in non-interfering relationship with said plurality of blade members affixed to said shaft, and

means for rotating said shaft at a velocity adequate to provide suitable agitation of said particles of polymer when said vessel is used to heat and expand said particles.

3,973,885
APPARATUS FOR PROGRESSIVELY CONSTRUCTING A WALL OF CEMENTITIOUS MATERIAL

Hans Heinrich Schmidt, Doncaster, Australia, assignor to Enor Nominees Pty. Limited, Australia

Continuation of Ser. No. 448,716, March 6, 1974, abandoned. This application July 21, 1975, Ser. No. 597,631

Claims priority, application Australia, Mar. 7, 1973, 2511/73; Mar. 7, 1973, 2513/73

Int. Cl.² E04G *11/02, 11/28*

U.S. Cl. 425—65 **20 Claims**

1. Apparatus for progressively constructing a plurality of substantially vertical walls of hardened cementitious material in successive, vertically incremental castings, said apparatus comprising,

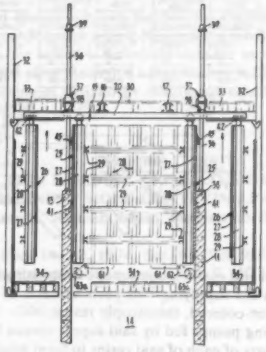
a formwork support structure means adapted to extend over said walls and form a rigid supporting assembly,

a plurality of pairs of formwork sections, at least one pair of formwork sections associated with each wall to be built, each pair of formwork sections comprising a first formwork section and a facing second formwork section,

first suspension means mounted for moveably suspending said first formwork section from said formwork support structure means in a substantially vertical, predetermined position,

second suspension means mounted for moveably suspending said second formwork section from said formwork support structure means in a substantially vertical, predetermined position, said second suspension means disposed relative to said first suspension means such that one formwork section of a pair is movable into a position

adjacent the other section of the pair to provide a cavity thereinbetween for receiving cementitious material, and such that said first formwork section is movable substantially laterally and horizontally away from the second formwork section at least a distance to permit access by a person between the first and second formwork sections, and such that said second formwork section is disengageable from the hardened cast cementitious material, movable jack means mounted for supporting said formwork support structure means on a completed wall section of hardened cementitious material while lifting all of said formwork sections in unison, together with said formwork support structure means, substantially vertically upward from a first casting position to a second casting position,



retractable support means mounted for supporting said apparatus from a completed wall section of hardened cementitious material during at least the period when said apparatus is unsupported by said movable jack means,

the movable jack means and the retractable support means disposed so that there are alternate periods wherein said formwork support structure means and formwork sections are supported by said retractable support means and not by said movable jack means and other periods wherein same are supported by said movable jack means and not by said retractable support means, provided, however, that during progressive wall construction, at least one of said movable jack means or said retractable support means supports said formwork support structure means,

interlocking means mounted for interlocking in a first position and a second retracted position at least one of the formwork sections of a pair to a formwork section of an adjacent pair to produce a structurally rigid and stable assembly of formwork sections in said first position during the casting of cementitious material, and in said second position during the lifting of said formwork sections between said first casting position and said second casting position,

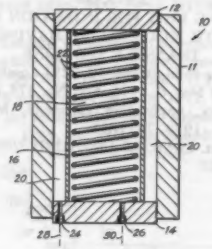
and guide means mounted for guiding the interlocked formwork sections to maintain alignment and to stabilize same during lifting between said first casting position and said second casting position by contact with at least one completed wall section of hardened cementitious material.

3,973,886

HOT ISOSTATIC PRESS

Andrew Stephenson Dalgleish Crum, Warren, Pa., assignor to National Forge Company, Irvine, Pa.

Filed May 6, 1975, Ser. No. 574,963
Int. Cl.² B30B *5/02, 11/00*
U.S. Cl. 425—78 **8 Claims**



1. In combination with an isostatic press adapted for hot isostatic pressing and including a cylindrical mantle which define a work area and an annulus between said mantle and the wall of said press, the improvement which comprises:

a. first and second ports in said press providing fluid communication to said work area and said annulus;

b. a three port pressure equalizing valve;

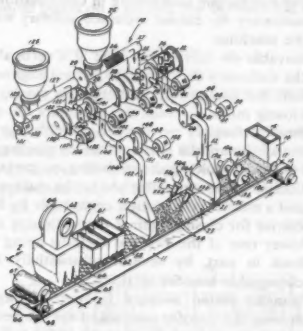
c. means providing fluid communication between said first and second ports and respective ports of said valve.

3,973,887

APPARATUS FOR PRODUCING NON-FELT LAMINAR ROOFING SHINGLES

Ernst G. Breckenfelder, Elmhurst, Ill., assignor to U.I.P. Engineered Products Corporation, Elk Grove Village, Ill.

Division of Ser. No. 337,636, March 2, 1973, Pat. No. 3,886,021. This application Jan. 16, 1975, Ser. No. 541,419
Int. Cl.² B29C *1/04, 15/00;* **B29D** *7/02*
U.S. Cl. 425—101 **8 Claims**



1. An apparatus for producing a laminated roofing shingle, said apparatus comprising:

a frame,

an endless belt mounted on said frame,

means for moving said belt continuously,

a first liquid asphalt applicator mounted above said belt for applying a first layer of asphalt on said belt,

a fibrous material chopping gun mounted above said belt for blowing chopped fibrous material into said first layer of asphalt,

a second liquid asphalt applicator mounted above said belt for applying a second layer of asphalt onto said first layer of asphalt,

means for cooling said first and second layers of asphalt to form a laminated roofing composition on said belt,

and means for removing said composition from said belt.

3,973,888

DIE CLOSING UNIT FOR INJECTION MOLDING MACHINE WITH MOLDING DIE HAVING MULTIPLE TRANSFER SECTIONS

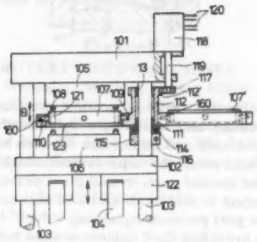
Karl Hehl, Arthur-Hehl-Strasse 32, 7291 Lossburg, Germany

Filed May 6, 1975, Ser. No. 575,147

Claims priority, application Germany, May 22, 1974, 2424782; May 6, 1974, 2421811

Int. Cl.² B29F *1/00*; B29D *3/00*

U.S. Cl. 425—125 **16 Claims**



1. In an injection molding machine specially adapted for producing injection molded articles with insert parts, such as threaded studs, for example, by at least partially embedding the latter in the articles, and where the injection molding die includes for this purpose a special transfer section of which the machine carries at least two substantially identical ones, which sections are alternatingly removable from the open die for the placement of one or more insert parts into a removed transfer section, as another transfer section forms part of the closed injection molding die and an article is being injection molded therein; in said machine, a die closing unit and die transfer mechanism comprising in combination:

a stationary die carrier mounted solidary with the base of the machine;

a movable die carrier arranged at a vertical distance from the stationary die carrier, in vertical alignment therewith;

means for guiding the movable die carrier for a vertical closing motion toward the stationary die carrier;

means for forcibly moving the movable die carrier against the stationary die carrier, thereby closing the die;

an injection molding die including, as parts thereof, a stationary die section attached to the stationary die carrier, and a movable die section engageable by the movable die carrier for closing against the stationary die section; the lower one of the two die sections being constituted, at least in part, by several substantially identical interchangeable transfer sections;

a transfer platen adapted for carrying and horizontally moving the transfer sections of the die between a loading station located outside the path of the movable die carrier and a transfer station located in the immediate vicinity of the movable die carrier; and

means for moving the transfer platen horizontally for alternating movement of the transfer sections between said loading and transfer stations; and wherein

the transfer platen includes means for guiding each transfer section from a position in its transfer station to a position in an adjacent closing station defined by said lower die carrier, where the weight of the transfer section is no longer carried by the platen, but by the movable die carrier; said guide means being located outside the path of the movable die carrier and oriented for a movement of the transfer sections substantially perpendicular to its movement between said loading and transfer stations; and

the die transfer mechansim further includes means associated with the closing station for moving a transfer section along its guide means between said transfer station and said closing station.

3,973,889

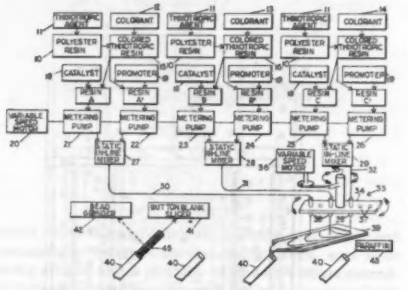
DECORATIVE ROD MAKING EQUIPMENT

Seymour I. Richman, Rochester, N.Y., assignor to Rochester Button Company, Rochester, N.Y.

Division of Ser. No. 512,845, Oct. 7, 1974, which is a continuation of Ser. No. 300,134, Oct. 24, 1972, abandoned. This application Oct. 24, 1975, Ser. No. 625,780

Int. Cl.² B29C *9/00*

U.S. Cl. 425—130 **11 Claims**



1. Button rod making equipment comprising:

a. means for supplying two parts of each of a plurality of different-colored, thixotropic resins;

b. metering pumps fed by said supply means for combining said parts of each of said resins to form accelerated resins of different colors;

c. static, in-line mixers fed by said pumps for mixing said parts of each of said accelerated resins and for reducing the apparent viscosity of said resins;

d. nozzle means downstream from said mixers for delivering said resins;

e. means for repeatedly moving said nozzle means reciprocally to deposit said resins in a predetermined zig-zag pattern;

f. a downwardly inclined trough under said nozzle means for receiving said resins in said zig-zag pattern; and

g. an inclined casting tube with a closed bottom end for receiving said resins pouring from a lower end of said trough so that said resins rest in said tube at a relatively high apparent viscosity.

3,973,890

ADJUSTABLE DIE FACE PELLETIZER

Carter E. Porter, Cranford, N.J.; Richmond S. Parsons, Warminster, and Paul H. Rossiter, Paoli, both of Pa., assignors to Exxon Research and Engineering Company, Linden, N.J.

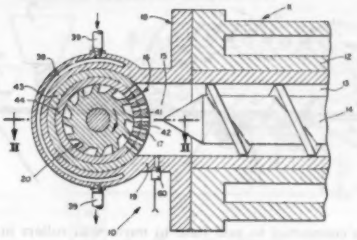
Continuation of Ser. No. 364,977, May 29, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,296

Int. Cl.² B29F *3/08*, *3/06*

U.S. Cl. 425—144 **9 Claims**

1. In a face-cutting apparatus for making pellets of thermoplastic material comprising an extrusion device, the discharge end of which terminates in a die means, said die means comprising a pair of concentric plates each with a plurality of extrudate-passing orifice holes extending therethrough, at least one plate being rotatably mounted with respect to the other, with the upstream-most or first plate comprising at least a portion of a generally cylindrical configuration, and present-

ing a convex surface in an upstream direction, with the downstream-most or second plate being generally cylindrical in configuration and being coaxial with the upstream-most plate and in mating nested engagement with a generally concave surface thereof, with said orifice holes in the plates being



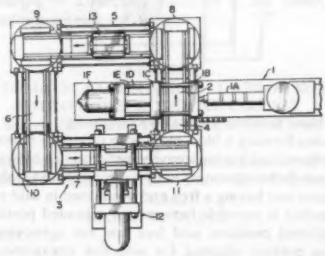
arranged and spaced similarly for precise alignment therebetween, the improvement which comprises a mounting for said second plate for selective infinitely variable movement relative to said first plate through a narrow range sufficient to vary the orifice openings defined by misaligned counterpart holes in the plates.

3,973,891

INJECTION MOLDING APPARATUS HAVING PERMANENT MOLD CONVEYING PATH

Sigemitu Yamada, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 2, 1974, Ser. No. 528,928
Claims priority, application Japan, Dec. 5, 1973, 48-135361
Int. Cl.² B29F *1/00*
U.S. Cl. 425—246 **2 Claims**



1. An injection molding apparatus having a permanent mold conveying path comprising

an injecting cylinder, a cylinder means for tightening a permanent mold, and an injection molding machine having an injection station between the injection cylinder and the cylinder means;

a mold conveying path of rectangular pattern having a starting point adjacent a side of the injection station and terminating at a terminal adjacent an opposite side of the injection station;

molded product removing means adjacent to the terminal of the mold conveying path and disposed at a right angle to the mold conveying path;

mold direction turning means located at respective corners of the mold conveying path for turning the permanent mold in a direction facilitating the aligning and opening of the permanent mold consisting of two halves divided along a vertical plane in the molded product removing means; and

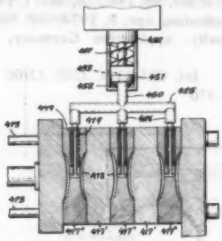
means for conveying the permanent mold along the mold conveying path such that the portion of the permanent mold cooperating with the conveying means remains in the same plane with respect to the conveying path during conveyance along the entire mold conveying path.

3,973,892

INJECTION-MOLDING MACHINE WITH TRANSVERSE FEED

Herbert Rees, Toronto Willowdale, Canada, assignor to Husky Injection Molding Systems, Toronto, Canada

Division of Ser. No. 218,625, Jan. 17, 1972, Pat. No. 3,723,040. This application Dec. 18, 1972, Ser. No. 315,890
The portion of the term of this patent subsequent to Mar. 28, 1989, has been disclaimed.
Int. Cl.² B29F *1/00*
U.S. Cl. 425—250 **2 Claims**



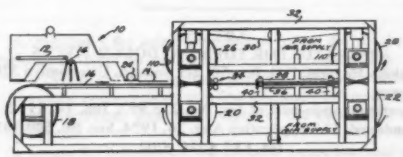
1. An injection-molding machine comprising a pair of press platens, a plurality of mating pairs of mold plates mounted in stacked relationship between said platens, said pairs of mold plates having mold cavities therebetween, an extruding device, a manifold reciprocable from an operative to a retracted position, and means for heating said manifold, said manifold connecting said extruding device to a cavity gate associated with each of said mold cavities whereby plastic material may be injected from said extruding device through said manifold and said cavity gates into said cavities in said mold plates, said extruding device being connected by said manifold to each of said pairs of mold plates on a parting line between the paired mold plates.

3,973,893

APPARATUS FOR CONTINUOUSLY MANUFACTURING BOARDS

Stafford V. Camp, III, Courtland, Va., assignor to Southampton Manufacturing Company, Inc., Richmond, Va.

Continuation of Ser. No. 354,906, April 26, 1973, abandoned. This application July 7, 1975, Ser. No. 593,199
Int. Cl.² B29C *15/00*; B29J *5/00*
U.S. Cl. 425—324 R **4 Claims**



1. Apparatus for continuously manufacturing board from a mixture of board particles and a bonding agent, comprising:

means for forming a mat of said mixture;

compressing means for sizing said mat;

a pair of spaced platens;

a pair of endless belts which engage surfaces on opposite side of the mat and which carry the mat from the mat

forming means past the compressing means and between said platens;

means associated with said platens for distributing fluid under pressure against said belts thereby developing fluid bearings between said platens and the belts and causing said mat to be dimensioned to its final size; and

means for heating said mat as it is carried between said platens to cure said bonding agent to form the board from said mat.

3,973,894

DEVICE FOR THE PRODUCTION OF TOOTHED BELTS

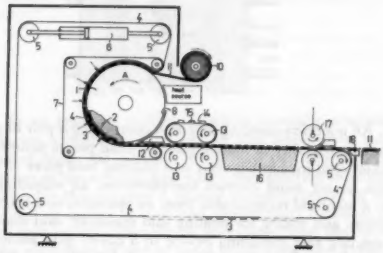
Ulrich Lindner, Berenbostel; Hugo Speichert, Garbsen; Walter Stritzke, Letter; Werner Kilian, Wettbergen; Dieter Bagowski, Nordsehl, and Horst Weber, Altwarmbuchen, all of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Division of Ser. No. 434,626, Jan. 18, 1974, abandoned, and a continuation of Ser. No. 194,226, Nov. 1, 1971, abandoned. This application Apr. 8, 1974, Ser. No. 458,674

Claims priority, application Germany, Nov. 2, 1970, 2053694

Int. Cl.² B29C *3/00*, *15/00*

U.S. Cl. 425—370 17 Claims



1. An apparatus for making toothed belts of rubber and of rubber-like elastic synthetic materials with an enveloping fabric covering the belt teeth fixed thereby in very accurately spaced relationship as precision machine elements which are in meshing engagement with accurately machined gears to assure orderly function of motors, office machines, fine mechanical device and the like, which includes in combination: belt teeth shaping means having a corrugated surface with elevations and depressions in conformity with the teeth to be generated on the toothed belt to be made, moveable means equipped with identical teeth equally spaced from each other and adapted successively to enter said depressions on said belt teeth shaping means, and cooling means arranged adjacent to and following when looking in the direction in which the teeth of said movable means successively enter said depressions.

3,973,895

APPARATUS FOR FORMING DOUGH PIECES

Torahiko Hayashi, P.O. Box 50, 2-3 Nozawa, Utsunomiya 320, Japan

Continuation-in-part of Ser. No. 215,997, Jan. 14, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,701

Int. Cl.² A21C *3/02*

U.S. Cl. 425—372 5 Claims

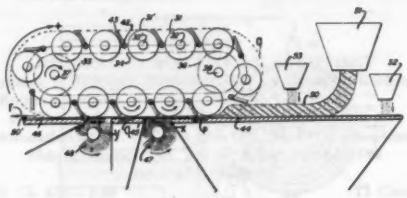
1. Apparatus for continuously stretching bread dough or forming moldable material, comprising

a base,

a plurality of rollers spread apart and rotatably positioned on said base in an elliptical path,

a plurality of conveyor belts below said rollers arranged in series and facing the lower portion of said elliptical path,

means operatively associated with said conveyor belts to rotate said conveyor belts relative to said base, the speed of each of said conveyor belts being faster than that of the nearest upstream conveyor,



means connected to said base to move said rollers in the same direction as the movement of said conveyor belts, and means connected to said base to positively control the rotational speed of said rollers independently of the speed of each of said conveyor belts.

3,973,896

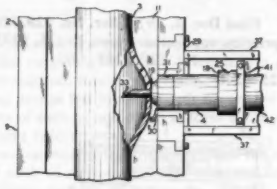
BLOW MOLDING APPARATUS

Donald L. Peters, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 12, 1975, Ser. No. 586,318

Int. Cl.² B29D *23/03*

U.S. Cl. 425—387 B 6 Claims



1. A blow molding apparatus comprising:

a. means forming a blow mold with relatively movable mold portions, and having a cavity for forming a blown article;

b. a mandrel cooperating with portions of said mold forming means and having a free end positioned in said cavity, the mandrel is movable between an extended position and a retracted position, said free end has a vacuum surface area portion adapted for selective engagement with a portion of a parison; and

c. a blow needle reciprocably mounted in said mandrel and selectively moveable between a first position for puncturing the parison and a second retracted position, said blow needle is movable independently of said mandrel.

3,973,897

FORMING MOLECULARLY ORIENTED CONTAINERS FROM PREFORMS

L. John Berggren, Simsbury, and Joseph R. Reilly, Naugatuck, both of Conn., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 507,395, Sept. 19, 1974. This application Sept. 2, 1975, Ser. No. 609,300

Int. Cl.² B29D *23/03*

U.S. Cl. 425—387 B 12 Claims

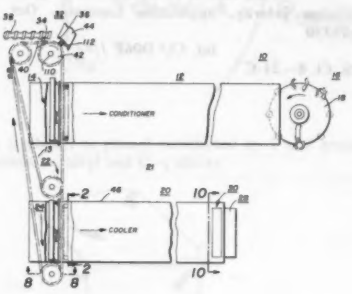
1. In apparatus for conditioning thermoplastic preforms to be molded into containers comprising:

a temperature-conditioning assembly for bringing preforms to molecular orientation temperature; and

a preform supply assembly for said temperature-conditioning assembly;

the combination therewith of:

A. preform cooling means proximate to but spaced from said temperature-conditioning assembly for reducing the temperature of preforms to substantially below molecular orientation temperature;



B. an integral extension of said supply assembly to accommodate said preform cooling means with preforms, said extension including a loading mechanism for said preform cooling means;

C. means selectively actuating said loading mechanism when any means downstreams of the supply assembly is inoperative to receive preforms, and

D. means for collecting preforms at the outlet of said preform cooling means.

3,973,898

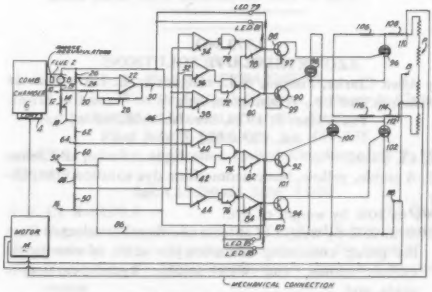
AUTOMATIC COMBUSTION CONTROL WITH IMPROVED ELECTRICAL CIRCUIT

Seymour Seider, 220 Willow Pond Lane, Hewlett Harbor, N.Y. 11557

Continuation-in-part of Ser. No. 426,323, Dec. 19, 1973, Pat. No. 3,861,855. This application Nov. 18, 1974, Ser. No. 524,462

Int. Cl.² F23N *5/08*

U.S. Cl. 431—76 **12 Claims**



1. Smoke control apparatus comprising a combustion chamber, means for supplying fuel and oxygen containing gas into said chamber, means for venting the products of combustion from said chamber, smoke accumulating means for amplifying the density of said products of combustion to facilitate the detecting and measuring of the same, photoelectric means providing an electrical signal in accordance with the thusly amplified density of the products of combustion, electrical circuit means for processing said electrical signal, and servo-mechanism means operated by said circuit means to control the means for supplying fuel and oxygen containing gas to optimize the supply thereof and therefore said density; said circuit means comprising bridge means to control said servo mechanism means, at least one first electronic switch operable when said density is equal to or less than a predetermined standard, at least one second electronic switch operable when said density is greater than said standard, said switches being coupled to and operating said bridge means, and further means coupled to and operating said bridge means, and further means coupled to said photoelectric means and to said switches to operate the latter in response to levels of said signal whereby to control said servo-mechanism means through said bridge means.

3,973,899

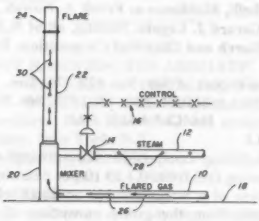
APPARATUS FOR USING EXHAUST STEAM FOR SMOKE SUPPRESSION IN FLARES

Robert D. Reed, and John S. Zink, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Feb. 3, 1975, Ser. No. 546,261

Int. Cl.² F23D *13/20*

U.S. Cl. 431—202 **8 Claims**



1. Apparatus for using low pressure steam for smoke suppressing in flares for vented hydrocarbons, comprising:

a. a cylindrical housing including pipe means for inflow of vented hydrocarbons at a first end and outflow of vented hydrocarbons plus water vapor to the flare stack to be burned;

b. means for introducing low pressure steam into said housing through a plurality of nozzles in a substantially transverse direction to said hydrocarbon gas flow so as to provide turbulence and mixing with the hydrocarbon gas flow; and

c. control means for controlling the rate of flow of low pressure steam in a selected relation to the rate of flow of hydrocarbons.

3,973,900

HAIR DYE

Hans Husemeyer, and Eugene Konrad, both of Darmstadt, Germany, assignors to Wella AG, Darmstadt, Germany

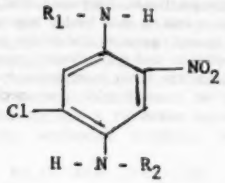
Continuation-in-part of Ser. No. 238,970, March 28, 1972, abandoned. This application Sept. 9, 1974, Ser. No. 504,655

Claims priority, application Switzerland, Mar. 29, 1971, 4530/71; Sept. 28, 1971, 14099/71

Int. Cl.² A61K 7/13

U.S. Cl. 8—10.1 13 Claims

1. A hair dyeing composition consisting essentially of an aqueous solution containing between 0.01 and 1.0% by weight of a dye having the formula



wherein R_1 and R_2 are hydrogen or hydroxyethyl substituents, the said composition having a pH of from between 7.0 to and about 10.5.

3,973,901

HAIR COLORING COMPOSITION CONTAINING A WATER-SOLUBLE CATIONIC POLYMER AND A PROCESS FOR USE THEREOF

Albert L. Micchelli, Middletown; Frank A. Nowak, Jr., Bound Brook, and Gerard J. Legato, Stirling, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 422,176, Dec. 6, 1973, abandoned. This application June 18, 1975, Ser. No. 587,824

Int. Cl.² A61K 7/13

U.S. Cl. 8—10.1 8 Claims

6. A hair coloring composition comprising an aqueous solution containing (A) from 0.1 to 10 per cent, by weight, of the total solution of a water soluble acid salt of a cationic polymer selected from the group consisting of aminoalkyl esters of (a) a homopolymer of a homopolymerizable unsaturated carboxylic acid having 3 to 5 carbon atoms, (b) a copolymer of a copolymerizable mixture of said unsaturated carboxylic acids, and (c) a copolymer of an unsaturated carboxylic acid having 3 to 5 carbon atoms and at least one copolymerizable ethylenically unsaturated comonomer selected from the group consisting of vinyl acetate, vinyl propionate, vinyl methyl ether, vinyl ethyl ether, the $C_1 - C_8$ alkyl esters and $C_1 - C_8$ alkyl half esters of maleic and fumaric acids, acrylamide, N-methyl acrylamide, methacrylamide and the $C_1 - C_{18}$ alkyl and $C_2 - C_4$ hydroxyalkyl esters of acrylic and methacrylic acids, wherein the copolymer of group (c) contains at least 25 mole per cent of the unsaturated carboxylic acid, and (B) from 0.01 to 1.0 per cent, by weight, of the total solution of an acid dye.

3,973,902

PROCESS AND DEVICE FOR THE CONTINUOUS FIXATION OF PRINTS AND PAD-DYEINGS ON POLYESTER FIBERS AND THEIR MIXTURES WITH CELLULOSE FIBERS

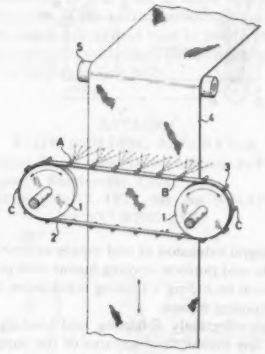
Hans Zimmermann, Hofheim, Taunus; Heinrich Thumm, Frankfurt am Main, and Kurt Roth, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 4, 1973, Ser. No. 403,649

Claims priority, application Germany, Oct. 7, 1972, 2249330

Int. Cl.² D06P 1/82

U.S. Cl. 8—21 C 1 Claim



1. In a process for the fixation of prints and pad-dyeings with disperse dyestuffs on material of polyester fibers or mixtures of polyester and cellulose fibers with carriers consisting essentially of mixtures of polyethyleneglycol ether of β-naphthol and long-chain alkane or alkene-monocarboxylic acid esters of butanediol-(1,4)-polyglycol ethers, the improvement comprising:

spraying an aqueous solution or dispersion of said carrier onto the dried, printed or padded fiber material at a liquor pick-up of 5 to 50% and immediately thereafter fixing the dyestuffs.

3,973,903

AZOMETHINE DYE SOLUTIONS

Ray Allen Clarke, Pitman, N.J., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Filed Mar. 5, 1974, Ser. No. 448,363

Int. Cl.² C08J 3/20

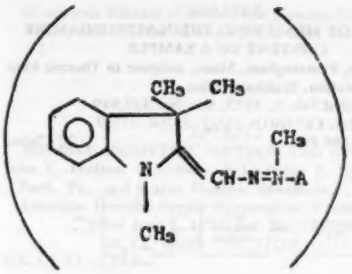
U.S. Cl. 8—92 8 Claims

1. A stable, yellow, basic azomethine dye solution comprising

5% to 50% by weight of dye,

10% to 95% by weight of at least one member selected from the group consisting of carboxylic acids of one to six carbon atoms, and water-soluble hydroxycarboxylic acids, and

0 to 40% by weight of water, the dye having the formula



wherein A is phenyl or phenyl substituted by 1 to 3 groups selected from C_{1-4} alkyl and C_{1-4} alkoxy.

3,973,904

WATER-SOLUBLE SYNTHETIC TANNING AGENTS

Horst Endres; Otto Hertel, and Franz-Friedrich Miller, all of Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 10, 1972, Ser. No. 233,755

Claims priority, application Germany, Mar. 18, 1971, 2113096

Int. Cl.² C14C *3/18*

U.S. Cl. 8—94.24 4 Claims

1. Synthetic water-soluble tanning agents substantially comprising a mixture of:

a. from 25 to 75% by weight — with reference to the weight of (a) + (b) — of condensation products based on formaldehyde and mono- or dinuclear aromatic hydroxy compounds free from aromatically bonded sulfonic acid groups, or the sulfomethylated condensation products thereof or mixtures of said aromatic hydroxy compounds and said sulfomethylated condensation products, and

b. from 75 to 25% by weight of aromatic or hydroxyaromatic sulfonic acids or their condensation products with formaldehyde or their condensation products with formaldehyde and urea, or a mixture of said compounds, at least a portion of said sulfonic acids being in the form of alkali metal salts, ammonium salts or both.

3,973,905

FABRIC TREATMENT

David Wilson, West Bridgeford, England, assignor to Clutsom-Penn International Limited, Coalville, England

Filed July 3, 1974, Ser. No. 485,538

Claims priority, application United Kingdom, July 9, 1973, 32511/73

Int. Cl.² D06M *3/28, 13/08*

U.S. Cl. 8—130.1 11 Claims

1. A process for the treatment of knitted fabric containing polyurethane yarn, said process comprising the steps of

a. forwarding the fabric continuously through a treatment region

b. subjecting said fabric in said region to the action of a swelling agent to swell the polyurethane yarn under conditions such as to reduce the modulus of said yarn by not more than 12.5 percent, and

c. drying said yarn after it has left said treatment region, thus causing said fabric to undergo relaxation in both length and width.

3,973,906

CHEESE HANDLING METHOD

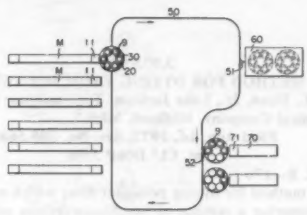
Takuzo Tooka, Toyoake, Japan, assignor to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Nov. 25, 1974, Ser. No. 527,146

Claims priority, application Japan, Dec. 6, 1973, 48-136552

Int. Cl.² B08B *3/00*

U.S. Cl. 8—149.3 4 Claims



1. A working method for handling yarns which have been wound on respective cylindrical bobbins in relatively large diameter packages and have been produced by one spinning machine, the packages being successively transported to one end of the spinning machine, the working method comprising the steps of placing the first of several successive packages, which have reached the end of the spinning machine, into one of a plurality of cylindrical canisters separately arranged on a package transporting device in manner such that the bobbins of the packages are stacked in end-to-end contact relationship; displacing all the canisters on the package transporting device to allow the next several successive packages to be placed into another canister in the same manner, the above procedures being repeated until all the canisters are filled with the packages; and transporting the package transporting device which carries thereon the package loaded canisters, to a next processing position while maintaining the package loaded canisters thereon.

3,973,907

DYEING OF HALOGENATED AROMATIC POLYESTER FIBROUS MATERIALS WITH DIMETHYLTEREPHTHALATE

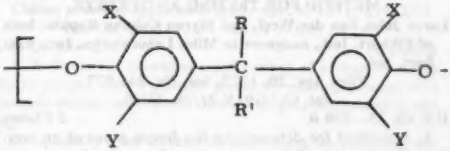
Alex S. Forschirm, Lake Hiawatha, N.J., assignor to Celanese Corporation, New York, N.Y.

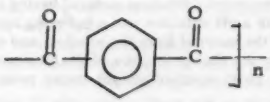
Filed July 28, 1975, Ser. No. 599,556

Int. Cl.² D06P *3/54*

U.S. Cl. 8—172 R 12 Claims

1. An improved process for dyeing of a halogenated aromatic polyester fibrous material having recurring units of the formula:





where X is chlorine or bromine, Y is hydrogen, chlorine or bromine, R and R′ may be the same or different and represent lower alkyl groups, hydrogen, or together constitute a cyclic hydrocarbon group, and $n =$ at least 25, comprising contacting said fibrous material with an aqueous dyebath in a closed dyeing zone at a temperature of about 110° to 130°C. containing a disperse dye and an effective concentration of a dimethylterephthalate dye carrier in the substantial absence of fiber degradation.

3,973,908

METHOD FOR DYEING FROM SOLVENTS

James L. Dunn, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 14, 1972, Ser. No. 280,568
Int. Cl.² D06P 5/00
U.S. Cl. 8—176 **8 Claims**

1. A method for dyeing polyester fiber which comprises:
1. preparing a volume of perchloroethylene solution containing the required amount of solvent soluble dyestuff dissolved therein to give the desired shade;
2. adjusting the volume of the perchloroethylene-dye solution to a volume sufficient to fill the dyeing equipment, auxiliary piping and an associated expansion flash chamber by adding water to said perchloroethylene-dye solution to prepare a two-phase liquid system;
3. contacting the adjusted two-phase liquid system with said fiber; while:
a. raising the temperature of said two-phase system to a temperature sufficient to dye the fiber;
b. maintaining a superatmospheric pressure on said system sufficient to maintain the liquids thereof substantially in the liquid state;
c. circulating the two-phase system through the dyeing equipment and the expansion flash chamber communicating therewith;
d. reducing the volume of solvent in said system by distilling the solvent from the system by releasing the pressure thereon in said flash chamber to vaporize said solvent and a portion of said water if it azeotropes with said solvent;
e. recycling the water and any solvent which does not flash off to the dyeing equipment;
f. continuing said circulation and said volume reduction while maintaining the volume of said system substantially constant by adding steam from a source external of the circulating water to the system; and
g. continuing said reduction of said solvent until the system is substantially free of solvent.

3,973,909

METHOD FOR TESTING ANTIFREEZE

Loren John Van der Werf, and Myron Colman Rapkin, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Apr. 20, 1972, Ser. No. 245,877
Int. Cl.² G01N 21/08, 25/06
U.S. Cl. 23—230 R **5 Claims**

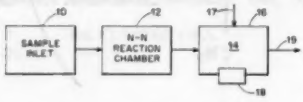
1. A method for determining the freeze point of an antifreeze-containing solution comprising the steps of:
immersing momentarily into the antifreeze-containing solution to be tested a bibulous material having incorporated therewith a pH indicator and a buffering agent;
removing the material from the solution; and then
comparing any change in color of the bibulous material to a color chart standardized for freeze point determinations.

3,973,910

METHOD OF MEASURING THE N-NITROSOAMINE CONTENT OF A SAMPLE

David H. Fine, Framingham, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed Feb. 5, 1973, Ser. No. 329,949
Int. Cl.² G01N 21/52, 23/54, 31/10
U.S. Cl. 23—230 PC **25 Claims**



1. A method of measuring the content in a sample of compounds having the general formula:

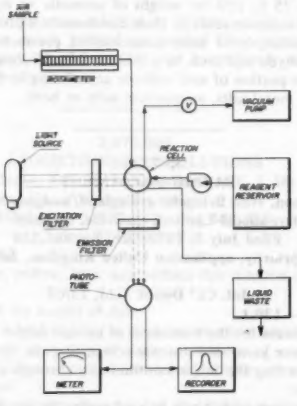
wherein R_1 and R_2 are the same or different organic radicals, including those radicals which together constitute with the non-nitroso N of the depicted N—NO bond a nitrogen heterocyclic radical, and wherein the N—NO bond is the weakest bond in the molecule, comprising the steps of:
a. heating the sample to provide an amount of thermal energy effective to break the N—NO bond and ineffective to break other molecular bonds in any substantial number for selectively liberating nitric oxide (NO), said heating step being the sole energization step for breaking molecular bonds; and
b. measuring in the gaseous phase the amount of nitric oxide (NO) liberated by said heating step.

3,973,911

SULFUR OXIDE DETERMINATION

Alfred von Smolinski, and Kuo-Chuan Feng, both of Bensenville, Ill., assignors to University of Illinois Foundation, Urbana, Ill.

Filed Feb. 6, 1975, Ser. No. 547,592
Int. Cl.² G01N 21/38, 31/00
U.S. Cl. 23—230 R **12 Claims**



1. A reagent suitable for use in quantitatively determining the sulfur oxide content of a fluid sample, said reagent essentially consisting of:

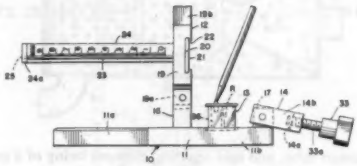
an aqueous solution of an acid and 5-amino-3-sulfo-salicylic acid, said solution having a pH of from about 1 to about 3.

3,973,912

MICRO-GASOMETRIC METHOD AND APPARATUS

John E. Trafton, Woodbury, N.J.; Philip E. Nichols, Ridley Park, Pa., and Royce Haynes, Sewell, N.J., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed June 2, 1975, Ser. No. 582,680
Int. Cl.[2] G01N 7/00, 31/20, 33/16
U.S. Cl. 23—230 B 16 Claims



1. A method of measuring the carbon dioxide content of a biological fluid, comprising the steps of introducing a measured sample of biological fluid into one portion of an open-topped reaction vessel containing in another portion thereof a reagent capable of liberating the carbon dioxide content of said biological fluid upon admixture therewith, then sealing said vessel so that the interior thereof communicates only with the lower end of a graduated transparent capillary tube containing an indicator liquid defining a meniscus visible through the wall of said tube, then adjusting the volume of the interior of said vessel to shift said indicator liquid in said tube until said meniscus is at a selected position along said graduated capillary tube, and thereafter mixing the contents of said reaction vessel while the same communicates only with said capillary tube to measure the amount of carbon dioxide liberated by observing the extent of displacement of said indicator liquid in said tube.

3,973,913

BLOOD CONTROL STANDARD

Allan L. Louderback, 9661 Longden, Temple City, Calif. 91780

Filed Jan. 29, 1976, Ser. No. 653,346
Int. Cl.[2] G01N 33/16
U.S. Cl. 23—230 B 9 Claims

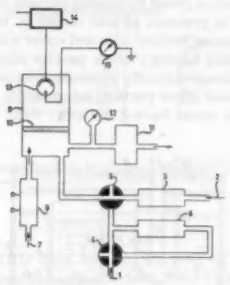
1. A blood control standard for the quality control of the measurement of blood pH and gases comprising a sealed receptacle containing treated erythrocytes and a gaseous head space having a volume which is at least equal to about the volume of said erythrocytes, said erythrocytes being treated by thorough washing in saline solution, mild admixing with a solution of aldehyde and saline, thorough washing in saline solution, buffering to a pH of from about 7 to about 7.7 and admixing with bicarbonate ion to a pCO_2 of from about 20 to about 55 mm Hg, said gaseous head space comprising from about 0% to about 15% CO_2, from about 0% to about 25% O_2 and the balance selected from the group consisting of N_2 and inert gases and mixtures thereof.

3,973,914

APPARATUS FOR THE DETERMINATION OF NITROGEN OXIDES IN AIR

Sybrandus van Heusden, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 3, 1974, Ser. No. 529,123
Claims priority, application Netherlands, Jan. 31, 1974, 7401320
Int. Cl.[2] G01N 31/00; C01B 21/24; C09K 3/00
U.S. Cl. 23—254 E 2 Claims



1. In an apparatus for simultaneously determining the amounts of nitrogen monoxide and nitrogen dioxide in air by means of an apparatus comprising an ozonizer suitable for supplying a continuous stream of ozone, a reaction chamber positioned to receive ozone from said ozonizer and air containing nitrogen oxide or air free of nitrogen oxide and containing a photomultiplier for measuring the luminescence emission of the reaction between nitrogen monoxide and ozone, a conduit connecting said ozonizer to said reaction chamber for transferring said ozone to said reaction chamber, a gas conduit opening into said reaction chamber containing a valve suitable for admitting air free of nitrogen oxide or air to be analyzed through said conduit opening into said reaction chamber, a reducer connected to said valve for reducing nitrogen dioxide in the air to be analyzed to nitrogen monoxide and a valved by-passing conduit for by-passing the reducer the improvement wherein said reducer comprises a container having an inlet and an outlet and is filled with a granular mixture of ferrous sulphate and an alkali metal acid sulphate in a molar ratio of from 3:1 to 1:1.

3,973,915

BLOOD EQUILIBRATOR

Italo Raffaele, and Luigi Rossi, both of Milan, Italy, assignors to Instrumentation Laboratory, Inc., Lexington, Mass.

Continuation-in-part of Ser. No. 493,316, July 31, 1974, abandoned, which is a continuation of Ser. No. 240,961, April 4, 1972, abandoned. This application Aug. 14, 1974, Ser. No. 497,256
Claims priority, application Italy, Apr. 9, 1971, 22982/71
Int. Cl.[2] B01L 11/00; G01N 31/00, 33/16
U.S. Cl. 23—259 18 Claims

1. A device for providing equilibration of a blood or other liquid sample with a gaseous phase by causing passage of a gaseous stream in presence of said sample, comprising a casing,

an upwardly open cuvette in said casing for receiving the liquid to be equilibrated, said cuvette having a vertical axis, and an annular upper edge,

means for supporting said cuvette in said casing for rotation about said vertical axis,

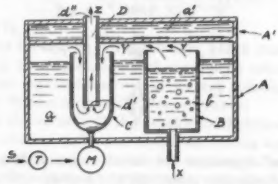
drive means for rotating said cuvette,

control means connected to said drive means for providing a sequence of spaced rotation steps to produce intermittent rotation of said cuvette about said vertical axis.

an outflow passage extending downwardly into said cuvette and having an inlet end below the upper edge of said cuvette,

and means for supplying a gaseous stream for flow over the upper edge of said cuvette and down into said cuvette for equilibrating contact with liquid in said cuvette as said liquid is being subjected to periodic centrifugating action by said drive means and said control means to cause periodic upward flow of said liquid along the wall of said cuvette, said gaseous stream flowing from said cuvette upwardly through said outflow passage.

3. A device for providing equilibration of a blood or other liquid with a gaseous phase by causing passage of a humidified gaseous stream in presence of said sample, comprising a stationary casing having bottom, side and cover walls and confining therein a space having a lower portion adapted for being flooded by a thermostatically controlled liquid heat carrier and an unoccupied upper portion, an upwardly open vessel in said space, said vessel having its upper edge in said upper



portion and adapted for accommodating an amount of humidifying liquid therein at a level below its upper edge, an upwardly open cuvette in said space and having a vertical axis, said cuvette having its upper edge in said upper portion and adapted for accommodating a liquid sample therein at a level below its upper edge, an outflow passage in said casing cover wall, downwardly extending within said cuvette and having an inlet end at a level below the cuvette upper edge, duct means for feeding a gas into said vessel for flow through said humidifying liquid and then into said cuvette over said cuvette upper edge for equilibrating contact with liquid in said cuvette and then from said cuvette upwardly through said outflow passage, means for supporting said cuvette for rotation about said vertical axis, drive means for rotating said cuvette, and a control device connected to said drive means for programming a sequence of spaced rotation steps of said cuvette to subject liquid in said cuvette to periodic centrifugating action and cause periodic upward flow of said liquid along the wall of said cuvette while said liquid is exposed to equilibrating contact with said gas.

3,973,916

EMISSIONS CONTROL SYSTEM FOR AN AUTOMOTIVE VEHICLE OR THE LIKE

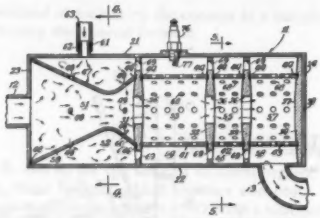
Everett E. Shelton, 506 W. College St., Harrisburg, Ill. 62946

Filed Apr. 1, 1974, Ser. No. 456,904

Int. Cl.[2] B01J *8/00*; F01N *3/10*

U.S. Cl. 23—277 C **7 Claims**

1. A reaction device for eliminating or substantially reducing the level of hydrocarbons, carbon monoxide, oxides of nitrogen and the like in the exhaust gas flow from an internal combustion engine or the like, comprising an elongated housing having a peripheral side wall and opposite end walls, said housing also having an inlet in one of said end walls adapted to be connected to said exhaust gas flow, an outlet through which said exhaust gas flow may discharge, and an auxiliary inlet in said peripheral side wall adjacent to said one end wall and adapted to be connected to a source of air under pressure for supplying air to the interior of said housing, at least one reacting element mounted in said housing between said inlet and said outlet, said reacting element extending transverse to and across the longitudinal axis of said housing so as to be in intimate flow relationship with said exhaust gas flow through said housing, said exhaust gas outlet communicating with the interior of said housing downstream from said reacting element, and a venturi tube mounted in said housing and having a nozzle end and a diffuser end, the axis of said venturi tube extending lengthwise of said housing, the nozzle end of said venturi tube engaging said one end wall and surrounding said exhaust gas inlet, and the diffuser end of said venturi tube engaging said reacting element, said venturi tube and said housing defining a chamber therebetween surrounding said tube, said auxiliary air inlet being directly connected to said chamber, said venturi tube also serving to direct said exhaust gas flow to said reacting element and having at least one aperture in the side wall thereof to permit air from said auxiliary inlet to mix with said exhaust gas flow passing through



said venturi tube, and said reacting element being of a porous ceramic material such as will cause the hydrocarbons, carbon monoxide, oxides of nitrogen and other noxious constituents of said exhaust gas flow to either disassociate or react with the oxygen supplied thereto through said auxiliary inlet so that said constituents are either eliminated or reduced to permissible levels before said exhaust gas flow is discharged through said housing outlet.

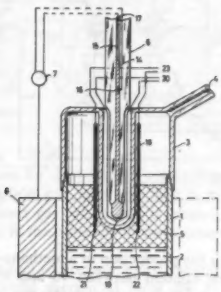
5. A reaction device for eliminating or substantially reducing the level of hydrocarbons, carbon monoxide, oxides of nitrogen and the like in the exhaust gas flow from an internal combustion engine or the like, comprising an elongated housing having a peripheral side wall and opposite end walls, said housing also having an inlet in one of said end walls adapted to be connected to said exhaust gas flow, an outlet through which said exhaust gas flow may discharge, and an auxiliary inlet in said peripheral side wall adapted to be connected to a source of air under pressure for supplying air to the interior of said housing, a venturi tube mounted in said housing and having a nozzle end and a diffuser end, the axis of said venturi tube extending lengthwise of said housing and the nozzle end of said venturi tube engaging said one end wall and surrounding said exhaust gas inlet, a plurality of plate-like reacting elements mounted in said housing between said inlet and said outlet and extending transverse to and across the longitudinal axis of said housing so as to be in intimate flow relationship with said exhaust gas flow through said housing, said venturi tube serving to direct said exhaust gas flow to said reacting elements and to mix air from said auxiliary inlet with said exhaust gas flow, said reacting elements having central openings therein, a plurality of coaxially arranged, tubular spacer members disposed between adjacent reacting elements and having their axes extending lengthwise of said housing, the ends of each tubular member engaging the opposite side faces of an adjacent pair of said reacting elements so that said tubular members maintain said reacting elements in axially spaced relation, the diameter of said tubular members being less than the diameter of said reacting elements and greater than the diameter of said central openings so as to define a plurality of inner and outer reaction chambers in said housing, said tubular members being perforated to permit fluid flow between said inner and outer chambers said auxiliary inlet communicating with the interior of said housing upstream from said reacting elements and said exhaust gas outlet communicating with the interior of said housing downstream from

said reacting elements, each of said reacting elements having at least one other opening therein spaced radially outwardly of said tubular members and providing communication between said outer reaction chambers, and said reacting elements being of a porous ceramic material such as will cause the hydrocarbons, carbon monoxide, oxides of nitrogen and other noxious constituents of said exhaust gas flow to either disassociate or react with the oxygen supplied thereto through said auxiliary inlet so that said constituents are either eliminated or reduced to permissible levels before said exhaust gas flow is discharged through said housing outlet.

3,973,917
METHOD FOR THE PURIFICATION OF SELENIUM BY PRECIPITATION FROM A MELT

Sten Tycho Henriksson, Skelleftehamn, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed July 30, 1973, Ser. No. 383,604
Claims priority, application Sweden, Aug. 4, 1972, 10172/72
Int. Cl.² C01B *19/00*
U.S. Cl. 23—293 R **3 Claims**



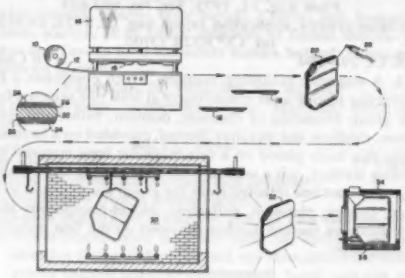
1. A method for producing selenium of extremely high purity from commercial grade selenium of high purity containing not over 0.1 to 1 gram/metric ton of impurities comprising introducing said commercial grade selenium into a receptacle, regularly varying the temperature of the surface of said selenium between 206° and 210°C. and maintaining the remainder of the selenium at a higher temperature for a period of time of some weeks to several months.

3,973,918
METHOD OF MAKING A GAS-FIRED FURNACE

James T. Tidwell, Clarksville, Tenn., assignor to The Trane Company, La Crosse, Wis.

Filed Dec. 5, 1975, Ser. No. 638,177
Int. Cl.² B23P *15/26*; B21D *53/04*
U.S. Cl. 29—157.3 D **11 Claims**

1. A method of making a high efficiency gas furnace having aluminized steel heat exchangers comprising the steps of: providing a metallic sheet material having a steel substrate, an iron-aluminum alloy intermediate bonding layer overlying said substrate and substantially iron-free aluminum outer layer overlying said intermediate layer; forming from said sheet material a plurality of concavo-convex sheet metal heat exchanger shells; connecting a pair of said heat exchanger shells together to form a hollow body heat exchanger; heating said heat exchanger shells substantially throughout within an oven to a temperature between that necessary to melt said iron-free aluminum outer layer as a lower limit and that required to anneal said steel substrate as a higher limit to improve the heat exchange efficiency of said heat exchanger shells; withdrawing said heat exchanger shells from said oven and cooling said heat exchanger shells substantially to ambient temperature;



and installing said hollow body heat exchanger into a furnace housing.

3,973,919
STRIP FOR SPRINGY CONTACTS

Hans Simon, Bruchhausener Strasse, 5463 Unkel, Rhine, Germany

Division of Ser. No. 347,569, April 3, 1973, Pat. No. 3,874,769. This application Jan. 9, 1975, Ser. No. 539,633
Claims priority, application Germany, Apr. 4, 1972, 2216174
Int. Cl.² H01R *9/08*
U.S. Cl. 29—193.5 **6 Claims**

1. A punched strip of electrically conductive sheet material from which a plurality of springy contacts can be cut, said springy contacts being arranged successively one after the other along said strip, and said strip comprising an elongated strip body having for each springy contact along said strip a first portion for forming a claw to engage insulation around a conductor, a second portion following said first portion for forming a claw to engage a conductor, and a base portion following said second portion and terminating in an end region, and said base portion having between said end region and said second portion which forms the claw to engage the conductor a pair of elongated portions for forming springy contact arms, said pair of elongated portions diverging away from said second portion of said strip body and defining between themselves where they are located closest to each other a space in which said end region is located and said pair of elongated portions defining between themselves where they are most distant from each other a given space, and at least that portion of the next contact which will form an insulation-engaging claw for the next contact being situated in said given space.

3,973,920

MAGNETIC RECORDING MEDIUM

Eiichi Tadokoro, and Tatsuji Kitamoto, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Aug. 11, 1975, Ser. No. 603,625
Claims priority, application Japan, Aug. 22, 1974, 49-95576
Int. Cl.² B32B 15/00
U.S. Cl. 29—194 8 Claims

1. A magnetic recording medium, which comprises a first protective plating layer consisting of at least one selected from the group consisting of rhenium, osmium, ruthenium, chromium, rhodium and mixtures thereof, provided on a ferromagnetic thin layer plated on a non-magnetic base material by a plating method, and a second protective plating layer consisting of at least one selected from the group consisting of silver, gold, copper, platinum, palladium, nickel-phosphorus alloys and mixtures thereof, further provided on the first protective plating layer.

3,973,921

NON-DETACHABLE TAB STOCK

Bennie R. Ward, Chesterfield County, and Donald R. Geisler, Chester, both of Va., assignors to Reynolds Metals Company, Richmond, Va.

Division of Ser. No. 452,077, March 18, 1974. This application Apr. 1, 1975, Ser. No. 563,966
Int. Cl.² B32B 15/00
U.S. Cl. 29—197.5 5 Claims

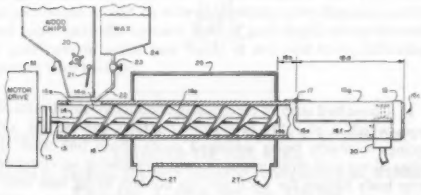
1. A doubly clad tab stock, adapted for an easy-open all-aluminum can, comprising a very strong core formed from a heat-treatable aluminum alloy and very soft and ductile claddings formed from a non-heat-treatable aluminum alloy arranged as a three-layer composit, said claddings being 10-35% of said tab stock per side, said tab stock having a high bending strength measured by a yield of at least 15 KSI, and a high flexing endurance measured by at least three flexes.

3,973,922

ARTIFICIAL LOGS AND LOG-MAKING METHOD AND APPARATUS

Thomas A. Williams, 620 S. Fourth St., Towanda, Pa. 18848

Filed Apr. 29, 1974, Ser. No. 464,795
Int. Cl.² C10L 5/22, 5/00; B29J 5/02, 5/08
U.S. Cl. 44—13 20 Claims



1. The method of forming artificial logs comprising the steps of rotatably forcing a mixture of ligno-cellulosic material and a flowable binder through first and second tube sections in succession to compact said mixture by pressure and friction occurring in said tube sections, and simultaneously controlling the cross-section of said second tube section to limit the friction and pressure occurring in both said first and second sections.

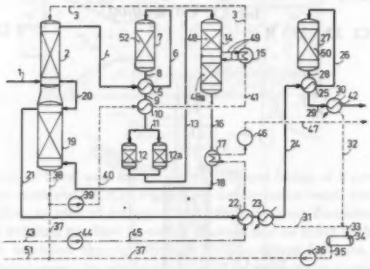
5. Apparatus for forming artificial lo[g]s comprising, in combination: a cylindrical casing having an entry end portion, an intermediate portion and an exit end portion; a rotatable feed screw disposed within said casing and extending along said entry end portion of said casing to said intermediate portion; means for introducing ligno-cellulosic material and a flowable binder material into said entry end portion of said casing, whereby said feed screw may transport said materials into said intermediate and exit end portions of said casing, said exit end portion of said casing having a portion movable to vary the cross-sectional area of said exit end portion; and means for applying a force to said movable portion to control movement of said movable portion, thereby to control the friction and pressures occurring within said intermediate and exit end portions of said casing.

3,973,923

PROCESSES FOR THE PRODUCTION OF METHANE-CONTAINING GASES

Hermann Staege, and Eberhard Goeke, both of Essen, Germany, assignors to Krupp-Koppers GmbH, Essen, Germany

Filed Oct. 31, 1974, Ser. No. 519,755
Claims priority, application Germany, Nov. 30, 1973, 2359741
Int. Cl.² C10J 1/00
U.S. Cl. 48—197 R 8 Claims



1. A process for the production of a methane-containing gas having a methane content between 40 and 99% by volume from a gas mixture which contains hydrogen, carbon dioxide and at least 20% by volume of carbon monoxide by catalytic conversion and methanation reactions which comprises the following steps in the specified sequence:

a. humidifying the gas mixture containing hydrogen, carbon dioxide and at least 20% by volume of carbon monoxide by passing the incoming gas mixture into contact with water heated as defined below in (g),

b. subjecting the humidified gas mixture to a partial conversion so as to reduce its content of carbon monoxide to between 10 and 20% by volume and produce a hot partially converted gas mixture,

c. desulfurizing the partially converted gas mixture,

d. subjecting the desulfurized gas mixture to a first catalytic methanation step and produce a hot methanated gas mixture,

e. cooling and dehumidifying the resulting gas mixture,

f. reheating the said cooled dehumidified gas mixture and subjecting it to a second catalytic methanation step prior to discharge, and

g. circulating the heating and cooling water in one common circuit, the water first passing in heat-exchange relation with the hot gas mixture discharged from the conversion step (above b) and then with the hot methanated gas mixture discharged from the first methanation step (above d) and the thus heated-up water thereupon being passed into direct contact with the incoming gas mixture in the humidifier (above *a*) where the said gas mixture is heated and saturated with water vapor to provide the water required in the conversion reaction, whereupon the cooled-down water discharged from the humidifier is passed into the dehumidifier (above *e*) into contact with the hot methanated gas mixture received from the first methanation step for washing and cooling the methanated gas mixture, the discharged water, including the con-

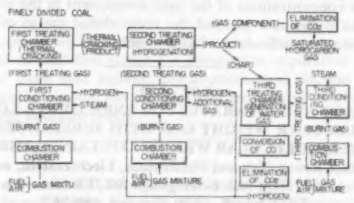
densed water withdrawn from the methanated gas mixture, being passed back into said circulation circuit.

2. A process as defined in claim 1 in which the partial conversion step b of the gas mixture is conducted at a gradually increasing temperature between 350° and 550°C, the first methanation step d at a gradually increasing temperature between 300° and 500°C, and the second methanation step at a gradually increasing temperature between 300° and 320°C.

3,973,924
PROCESS FOR CONTINUOUSLY CONVERTING COAL INTO A SATURATED HYDROCARBON GAS

Shozo Ito, Ichikawa, Japan, assignor to Mifuji Iron Works, Ltd., Tokyo, Japan

Filed Nov. 4, 1974, Ser. No. 520,669
Claims priority, application Japan, July 8, 1974, 49-077406
Int. Cl.² C10J *3/46, 3/54;* C10K *1/00*
U.S. Cl. 48—202 **15 Claims**



1. In a process for continuously converting coal into a saturated hydrocarbon gas, in which fuel is burned to provide substantially inert gas, which gas is treated with steam, and coal is cracked in the presence of the product, the steps which comprise:

1. burning a fuel to prepare a first substantially inert burnt gas containing therein at most 2% by volume of free oxygen, and feeding the first inert burnt gas into a first conditioning chamber;
2. in the first conditioning chamber mixing the first inert burnt gas with steam to form a first treating gas which has a predetermined temperature between 400° and 600°C, a predetermined pressure between 25 and 50 kg/cm² and a predetermined composition including 0.25 to 0.5 kg of steam per kilogram of coal to be converted and introducing the first treating gas thus prepared into a first treating chamber;
3. thermally cracking finely divided coal in the first treating chamber with the first treating gas while fluidizing the coal;
4. separately from steps 1 – 3 burning fuel to prepare a second substantially inert burnt gas separately from said first inert burnt gas, said second gas containing therein at most 2% by volume of free oxygen, and feeding the second inert burnt gas into a second conditioning chamber maintained separately from said first conditioning chamber;
5. mixing said second burnt gas with hydrogen gas in the second conditioning chamber to provide a second treating gas which has a predetermined temperature between 600° and 800°C, a predetermined pressure between 20 and 50 kg/cm² and a predetermined composition including therein 1.1 to 1.6 Nm³ of hydrogen gas per kilogram of coal to be converted, and introducing said second treating gas thus provided into a second treating chamber;
6. conveying to and hydrogenating in a second treating chamber, said thermally cracked product from cracking step (3) with said second treating gas while fluidizing said thermally cracked product, and
7. isolating the resulting saturated hydrocarbon gas from the hydrogenation mixture in step (6).

3,973,925
MANUFACTURING PROCESS FOR A METAL BONDED GRINDING TOOL AND THE METAL BONDED GRINDING TOOL PRODUCED THEREBY

Toshio Asaeda, Tokyo; Ikuo Suzuki, Chiryu, and Tomoyasu Imai, Kariya, all of Japan, assignors to Toshio Asaeda, Tokyo and Toyoda Koki Kabushiki Kaisha, both of, Japan, part interest to each

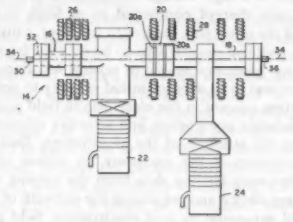
Filed Mar. 20, 1974, Ser. No. 453,061
Claims priority, application Japan, Mar. 20, 1973, 48-31366
Int. Cl.² B24D *3/10*
U.S. Cl. 51—295 **17 Claims**

13. A metal bonded grinding tool comprising:
a rim formed from a sintered alloy;
abrasive grains press-formed in contact with said rim; and
a nickel plated layer disposed upon the surfaces of said abrasive grains and within said rim throughout the entire extent thereof so as to continuously bond said rim and said abrasive grains together and to bond said abrasive grains uniformly in the axial direction of said rim, said layer only partially filling the interstices defined between said abrasive grains.

3,973,926
PROCESS AND EQUIPMENT FOR THE MAGNETIC SEPARATION OF ISOTOPES

Enrico Levi, Forest Hills, N.Y., assignor to Advanced Technology Laboratories, Inc., Westbury, N.Y.

Filed Jan. 23, 1974, Ser. No. 435,891
Int. Cl.² B03C *1/00*
U.S. Cl. 55—3 **10 Claims**



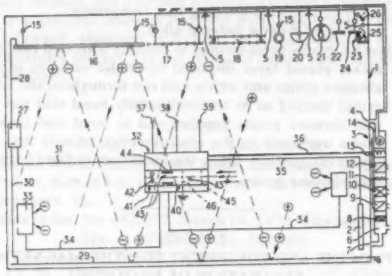
1. A method for continuously separating charged particles from neutral particles comprising the steps of:

a. introducing a gaseous mixture into a conduit;
b. ionizing selectively the mixture of gases within said conduit to form selected charged and neutral particles;
c. generating magnetic fields in first upstream and second downstream sections of said conduit and passing said ionized mixture of gases therethrough,
   1. the magnetic field intensity in the first section being substantially greater than the magnetic field intensity in the second section;
d. establishing a restriction means between said two sections to maintain a pressure differential therebetween;
e. accelerating said charged particles along an axis through said first and second sections;
f. removing said neutral particles by pump means in a path outwardly and transverse to the axis of travel of said charged particles while said charged particles are being accelerated;
g. maintaining a pressure in said conduit of less than one Torr.;
h. and removing said charged particles substantially free of said neutral particles.

3,973,927
PROCESS AND INSTALLATION FOR CREATING OPTIMUM CLIMATIC CONDITIONS IN A ROOM BY AIR PURIFICATION AND IONIZATION CONTROL

Helmut Furchner, Wilhelm-Haspel Strasse, D-7032 Sindelfingen 63, Germany, and Bernard Stroiazzo, rue Paul Deroulede, F-54520 Laxou 24, France

Filed Jan. 20, 1975, Ser. No. 542,252
Claims priority, application France, Jan. 22, 1974, 74.02975
Int. Cl.² B03C 3/68
U.S. Cl. 55—4 9 Claims



1. A process for electrically establishing optimal climatic conditions and for ionizing and purifying the air in a building, room or enclosure, characterized by establishing, with or without air conditioning or heating an adjustable, vertical electrostatic field between the floor and ceiling of said enclosure by means of a high voltage electrostatic field generator having one pole thereof connected to at least one ceiling electrode and the other pole thereof to the floor, causing small and medium negative oxygen ions to be emitted from a negative oxygen ion generator in one or several locations in sufficient numbers and at an average initial velocity to generate an ionic convection current in the electrostatic field and provide an ionic population equilibrium and selective climatic conditions, sensing the strength of the electrostatic field and the ionic concentration in the enclosure by means of sensing means, continuously feeding data from the sensing means to a co-ordinating device and regulating the strength of the electrostatic field generated by said electrostatic field generator and the rate of emission of said negative ions from said negative ion generator by means of said coordinating device so as to maintain the following parameters in the enclosure:

an electrostatic field volume of from 500 to 2000 volts/meter.

a ratio of small and average positive ions to negative oxygen ions in the room of from 0.7 to 1.3, and

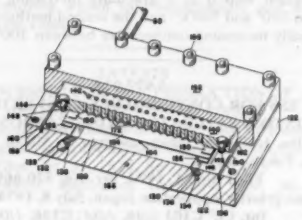
a ground resistance of from 10^9 to 10^{11} ohm - centimeter.

3,973,928
APPARATUS FOR DIFFUSION SEPARATION

William A. Nierenberg, Ann Arbor, Mich., and Rex B. Pontius, Rochester, N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 28, 1949, Ser. No. 73,304
Int. Cl.² B01D 53/22
U.S. Cl. 55—16 4 Claims

1. The method of testing the separation efficiency of porous permeable membranes which comprises causing a stream of a gaseous mixture to flow into contact with one face of a finely porous permeable membrane under such conditions that a major fraction of the mixture diffuses through the membrane, maintaining a rectangular cross section of the gaseous stream so flowing past said membrane, continuously recirculating the gas that diffuses through said membrane and continuously withdrawing the gas that does not diffuse through said membrane and maintaining the volume of said recirculating gas constant by continuously introducing into said continuously recirculating gas stream a mass of gas equivalent to that which

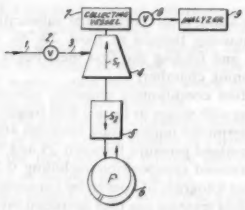


is continuously withdrawn from said gas stream and comparing the concentrations of the light component in the entering gas, the withdrawn gas and the recirculated gas in order to determine the efficiency of said membrane.

3,973,929
METHOD AND APPARATUS FOR ENRICHING A LOWER MOLECULAR WEIGHT GAS WITH SUBSTANCES OF HIGHER MOLECULAR WEIGHT CONTAINED THEREIN

Thaddäus Kraus, Triesen, Furstentum, Liechtenstein, assignor to Balzers Patent und Beteiligungs AG, Liechtenstein

Filed July 5, 1974, Ser. No. 486,067
Claims priority, application Switzerland, July 12, 1973, 10209/73
Int. Cl.² B01D 45/12
U.S. Cl. 55—17 10 Claims



1. A method for enriching a gas of lower molecular weight with substances of higher molecular weight contained therein using a first molecular pump and a second pump each having a working chamber, comprising conducting the gas to the working chamber of the first molecular pump and conveying away a portion of the gas at the intake side of the first molecular pump directly to the second pump, operating the second pump with gas taken directly into its inlet from said first pump to convey the substances in an opposite direction, and collecting the substances of higher molecular weight at the exhaust side of the first molecular pump for a certain time until they are concentrated and then extracting the concentrated substances of higher molecular weight.

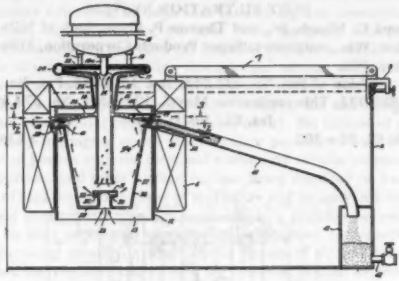
3,973,930
DRILLING MUD DEGASSER APPARATUS AND METHOD

Harry L. Burgess, 5400 Memorial Drive, Apt. 511, Houston, Tex. 77007

Continuation-in-part of Ser. No. 404,399, Oct. 9, 1973, abandoned. This application June 21, 1974, Ser. No. 483,935
Int. Cl.² B01D 19/00
U.S. Cl. 55—41 30 Claims

1. A degasser apparatus comprising a casing, a hollow (motor) rotor body rotatably mounted in said casing and having

a fluid inlet and first and second fluid outlets, respectively, in inner and outer parts of said body, power means for rotating said body to draw fluid into said body and to discharge lighter and heavier constituents of said fluid, respectively, through



said outlets by centrifugal action, and suction means connected to said first outlet for assisting in separation of said lighter from said heavier constituents, said suction means comprising a pump mounted on said casing and communicating with said first outlet.

3,973,931

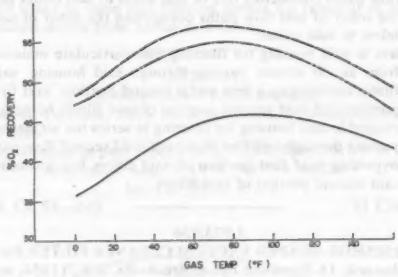
AIR SEPARATION BY ADSORPTION

John Joseph Collins, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 519,267, Oct. 30, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,341

Int. Cl.² B01D *53/04*

U.S. Cl. 55—58 **12 Claims**



1. In an adiabatic pressure swing process for air separation by selectively adsorbing at least nitrogen alternately in at least two crystalline zeolite molecular sieve adsorption beds of at least 4 Angstroms apparent pore size at ambient temperature by introducing feed air at temperatures less than 90°F to the inlet end of a first adsorption bed at high pressure, discharging at least 60% oxygen from the discharge end, concurrently depressurizing said first bed and terminating such cocurrent depressurization when the first bed is at lower pressure, returning part of the first bed gas from the cocurrent depressurization for repressurization of another adsorption bed, releasing waste gas from the first bed inlet end thereby countercurrently depressurizing same to said lowest pressure, introducing oxygen gas from another adsorption bed discharge end to the first bed discharge end as purge gas for desorption of the nitrogen adsorbate and discharging the adsorbate-containing purge gas from the first bed inlet of an other-than-first adsorption bed and at above said lowest pressure to the purged first bed for at least partial repressurization thereof, with the aforedescribed gas flows being such that the coldest gas temperature within the first bed inlet end is no warmer than 35°F and the temperature difference within the first bed is at least 15°F: the improvement comprising heating by an external source only the first bed inlet end sufficiently to maintain the gas flowing therethrough at maximum temperature of at least 20°F warmer than such gas without such heating but less than 175°F.

3,973,932

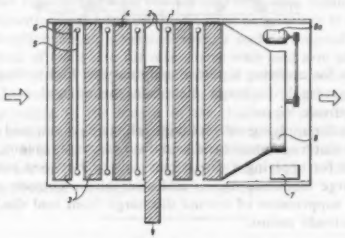
APPARATUS FOR ELECTRODYNAMICALLY SEPARATING PARTICLES FROM A GAS

A. Magnus Alskog, Skara, Sweden, assignor to AB Lectrostatic, Skara, Sweden

Filed Apr. 23, 1974, Ser. No. 463,418

Int. Cl.² B03C *3/51*

U.S. Cl. 55—132 **2 Claims**



1. An apparatus for electrically separating particles from a gaseous stream comprising:

a housing with inlet and outlet means for flow of the gaseous stream therebetween;

high-tension means in the housing for charging the particles in the gaseous stream, the high-tension means being connected to a source of high voltage direct current; and,

a plurality of earthed collecting elements arranged in the housing to collect charged particles in the gaseous stream, each collecting element comprising a matrix of alternate flat paper strips and corrugated paper strips glued to each other to form through-flow channels for the gaseous stream, the periphery of the matrix being connected with an electrically conducting, earthed metallic layer to form a block of corrugated paper with edge portions connected to current conducting earthing means, the block of corrugated paper being divided into layers by spaced electrically conducting metal foil means interleaved between at least some portions of the matrix formed by said paper strips, each said electrically conducting metal foil means being connected to said earthed metallic layer along the periphery of the block,

the housing having an opening to receive said collecting elements therein and including supporting means for supporting the collecting elements within the housing,

the high-tension means being disposed between the collecting elements in the housing.

3,973,933

PARTICLE CHARGING DEVICE AND AN ELECTRIC DUST COLLECTING APPARATUS

Senichi Masuda, 40-10-605, 1-chome, Nishigahara, Kita, Tokyo, Japan

Division of Ser. No. 496,537, Aug. 12, 1974. This application May 30, 1975, Ser. No. 582,250

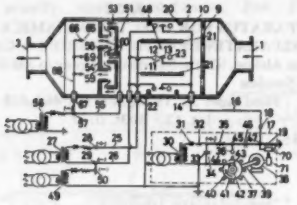
Claims priority, application Japan, Aug. 14, 1973, 48-91188; Sept. 7, 1973, 48-100904

Int. Cl.² B03C *3/12*

U.S. Cl. 55—139 **5 Claims**

1. For use in an electrical dust precipitator, an improved charging section comprising:

a housing through which a gas to be filtered passes;
discharge electrode means positioned in said housing;
opposite electrode means positioned in said housing in spaced relationship to said discharge electrode means;
third electrode means positioned in spaced relationship to said discharge electrode means and said opposite electrode means;



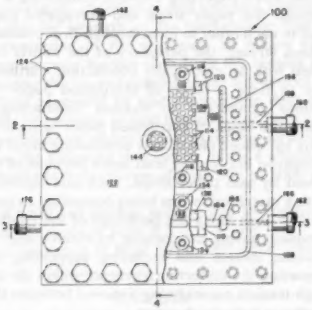
means for applying a periodically varying high voltage between said discharge electrode means and said third electrode means;
means for applying a direct high voltage between said opposite electrode means and said third electrode means; and
means for applying a direct bias voltage between said discharge electrode means and said third electrode means for suppression of corona discharge from said discharge electrode means.

3,973,934

APPARATUS FOR DIFFUSION SEPARATION

William A. Nierenberg, Ann Arbor, Mich., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 23, 1949, Ser. No. 77,848
Int. Cl.² B01D *13/00, 59/12*
U.S. Cl. 55—158 **5 Claims**



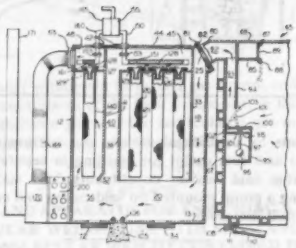
1. A diffuser separator apparatus which comprises a plurality of flow channels in a single stage, each of said channels having an inlet port and an outlet port and a constant cross sectional area between said ports, at least a portion of the defining surface of each of said channels being a diffusion separation membrane, and each of said channels having a different cross sectional area, means for connecting said channels in series so that each successive channel of said series has a smaller cross sectional area than the previous channel of said series, a source of gaseous mixture, individual means for flowing said gaseous mixture to the inlet port of each of said channels, gas receiving and analyzing means, individual means for flowing gas passing from each of said outlet ports and means for flowing gas passing through said membranes to said receiving and analyzing means, and individual means for connecting the outlet port of each channel with the inlet port of the channel having the next smaller cross sectional area.

3,973,935

DUST FILTRATION SYSTEM

Lionel G. Moore, Jr., and Thomas P. Flynn, both of Milwaukee, Wis., assignors to Super Products Corporation, Milwaukee, Wis.

Division of Ser. No. 432,243, Jan. 10, 1974, Pat. No. 3,885,932. This application May 5, 1975, Ser. No. 574,694
Int. Cl.² B01D *46/04*
U.S. Cl. 55—302 **13 Claims**



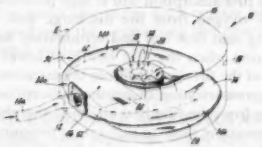
1. A filter for vacuum loading or cleaning devices comprising:
a housing having two inlets and an outlet,
means for creating an air stream flow through said housing from said inlets to said outlet
air stream directing means within said housing defining two air stream flow paths through said housing, one of said flow paths connecting one of said inlets to said outlet and the other of said flow paths connecting the other of said inlets to said outlet,
filters in said housing for filtering fine particulate material from an air stream passing through said housing, said filters comprising a first and a second portion, said first portion and said second portion of said filters being arranged in said housing for filtering in series the air stream passing through said first flow path, said second flow path bypassing said first portion of said filters but including said second portion of said filters.

3,973,936

HORSESHOE-SHAPED VACUUM CLEANER FILTER BAG

Sol Howard, 15 Wenwood Drive, Brookville, N.Y. 11554, and Robert Schaaf, 97-07 99th Ave., Ozone Park, N.Y. 11416

Filed Jan. 28, 1975, Ser. No. 544,804
Int. Cl.² B01D *46/02*
U.S. Cl. 55—363 **9 Claims**



1. A vacuum cleaner filter bag comprising first and second substantially identical horseshoe-shaped planar sheets of porous material which permit air to penetrate and flow there-

through, connecting means for connecting peripheral edges of said sheets to provide two tubular leg portions and a tubular connecting portion between said leg portions to define a continuous wall enclosing a horseshoe-shaped cavity, said connecting means being disposed along a longitudinal plane of symmetry extending through said tubular leg and connecting portions, said tubular leg portions being generally identical and symmetrically disposed on opposite sides of a transverse plane of symmetry extending through said tubular connecting portion, air inlet means provided on said tubular connecting portion in said first sheet of porous material for admitting a stream of air under pressure into said cavity, the stream of air generally impinging on an inner surface portion of said first sheet of porous material disposed within said tubular connecting portion, said inner surface portion being disposed on each side of said transverse plane of symmetry and on only one side of said longitudinal plane of symmetry in a position between said air inlet means and said tubular leg portions, air impervious blocking means for directing the stream of air and debris carried thereby into said tubular leg portions, said air impervious blocking means being provided on said inner surface portion to decrease overall porosity at said inner surface portion so that the stream of air is not materially dissipated by passage and penetration through said tubular connecting portion, said air impervious blocking means including a planar smooth sheet of flexible non-abrasive plastic material covering said inner surface portion, fastening means for securing said flexible plastic sheet material to said inner surface portion, opening means disposed in said tubular connecting portion to provide an opening through which the debris may be expelled from said cavity, said opening means being defined by peripheral end portions of said first and second sheets, said end portions being disposed along said longitudinal plane of symmetry and spaced from said flexible plastic sheet by said air inlet means, and closure means for securing said end portions together to close said opening means during use of said filter bag and for permitting said end portions to be separated from each other to open said opening means for removal of accumulated debris from within said cavity.

3,973,937

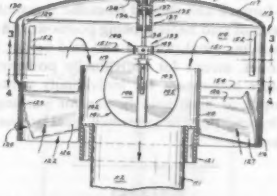
ENGINE AIR PRECLEANER

Ross K. Petersen, 2974 W. River Road, Minneapolis, Minn. 55406

Continuation-in-part of Ser. No. 571,584, April 25, 1975. This application Aug. 7, 1975, Ser. No. 602,667

Int. Cl.² B01D *45/12*

U.S. Cl. 55—449 **21 Claims**



1. An apparatus mountable on a low pressure intake stack for separating particulates from particulate entrained gas for entry into the stack, comprising: a housing having a chamber, said housing including a generally tubular and vertical side wall surrounding the chamber, first end wall means attached to said side wall closing one end of said chamber, second end wall means attached to the side wall at the other end of said chamber, said second end wall means having a vane assembly having at least one inlet passage angularly positioned for directing the gas and particulates into the chamber in a circular direction whereby the particulates move outwardly by centrifugal force, and a tubular sleeve adapted to be mounted on a low pressure intake stack, said tubular sleeve located concentrically with said chamber and defining an outlet passage adapted to carry gas into said stack and extending substantially coaxially relative to the side wall into and open to the chamber for carrying gas separated from a substantial part of the particulates out of the chamber into the outlet passage, said outlet passage having an inlet opening located in the central portion of said chamber, said side wall having at least one elongate, vertical discharge opening spaning the vertical expanse of the side wall a length approximately equal to the vertical height of the chamber above the vane assembly, and spaced from the outlet passage providing a passageway for gas and particulates from the chamber, a rotor assembly located in said chamber to induce discharge of particulates from the chamber through the discharge opening, said rotor assembly including a plurality of arms extending from the center of said chamber radially outward toward said side wall, means rotatably mounting said arms on the housing for rotation in at least one direction about a vertical axis, a paddle secured to the outer end of each arm for movement with said arm adjacent the inside of said side wall, each of said paddles including an elongate, vertically oriented blade having a length generally corresponding to the length of the discharge opening, said discharge opening being tangentially directed relative to the side wall in the direction of rotation of said arms whereby said paddles are effective upon rotation of said arms to move gas and particulates through the discharge opening.

3,973,938

METHOD FOR TEMPERATURE CONTROL OF REFRIGERATING MACHINES OPERATING WITH THERMOELECTRIC MODULES

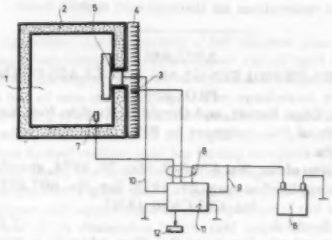
Kálmán Szabo, Ugocsa u. 16, H-1126 Budapest, and János Vígyi, Gaal J. 13/b., H-1122 Budapest, both of Hungary

Filed Jan. 21, 1975, Ser. No. 543,225

Claims priority, application Hungary, Jan. 25, 1974, SA-2585

Int. Cl.² F25B *21/02*

U.S. Cl. 62—3 **7 Claims**

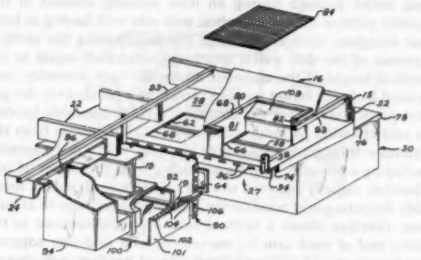


1. A method for temperature control of refrigerating machines operating with thermoelectric modules comprising the steps of sensing the temperature of a heat exchanger coupled to the warm side of said thermoelectric module; controlling the voltage applied to said thermoelectric module on the basis of the sensed temperature signal within a range defined between a maximum and a predetermined minimum value exceeding zero; and reducing the thermal load of said warm side heat exchanger by this control by reducing the voltage applied to said thermoelectric module when said sensed temperature of said warm side heat exchanger rises above a predetermined maximum.

3,973,939
AIR CONDITIONING SYSTEM FOR MOBILE HOME

Roy W. Abbott, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Jan. 16, 1975, Ser. No. 541,665
Int. Cl.² F25D *15/00*
U.S. Cl. 62—237 14 Claims



1. An air conditioning system including a mobile home having at least one zone to be air conditioned and a base structure, air distribution means associated with said base structure, said system comprising:

an air conditioning unit including a cabinet having air moving means, air delivery and air return outlets, and being adapted to be removably attached to said mobile home;

said air distribution means including at least one air inlet for receiving air from said air conditioning unit and air outlet for delivering air into said mobile home zone;

mounting means attached to said base structure for removably receiving said air conditioning unit including a first opening aligned with said air conditioning air delivery outlet and a second opening in alignment with said unit's air return outlet when said unit is located in said mounting means; and

air communicating means including a first passageway connecting said first opening and with said air distribution means for delivering air into said mobile home and a second passageway for connecting said second opening with said mobile home interior so that said air moving means recirculates air through said mobile home.

3,973,940
DELIVERY OF MOLTEN GLASS TO A GLASS FORMING PROCESS

Charles K. Edge, Sarver, and Gerald E. Kunkle, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

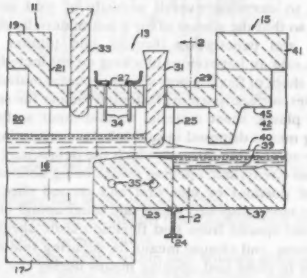
Continuation of Ser. No. 474,848, May 30, 1974, abandoned.
This application Aug. 25, 1975, Ser. No. 607,857
Int. Cl.² C03B *18/02*
U.S. Cl. 65—65 A 7 Claims

1. In a method of making flat glass wherein a stream of molten glass is delivered along a substantially horizontal delivery path from a pool of molten glass onto a pool of molten metal, the stream having marginal quarter width portions of greater depth than its central half width portion; wherein the delivered glass is advanced as a layer along the surface of the pool of molten metal while being cooled sufficiently to form a dimensionally stable continuous sheet of glass; wherein the continuous sheet of glass is removed from the pool of molten metal; and wherein the rate of molten glass delivery is varied from time to time such that higher and lower throughputs of molten glass are delivered at different times; the improvement which comprises

adjusting and maintaining the temperature of the molten glass prior to delivery across the width of the stream by maintaining the molten glass of the central half width portion sufficiently hotter when at a lower throughput than when at a higher throughput and maintaining the molten glass of the marginal quarter width portions sufficiently colder when at a lower throughput than when at a higher throughput to maintain molten glass throughput in the combined marginal quarter width portions to be at least 90 percent of molten glass throughput in the central half width portion; and

adjusting and maintaining the temperature of the delivered glass across its width at a temperature sufficient to provide the advancing glass with surface velocities in its marginal quarter width portions that are at least 90 percent of its surface velocity in its central half width portion at a location spaced the width of the delivered glass from the location at which the glass is delivered onto the molten metal; whereby the continuous sheet of glass has substantially uniform thickness across its width.

3. In an apparatus connecting a glass making furnace to a glass forming chamber for delivering molten glass from a pool of molten glass in the furnace onto a pool of molten metal in the chamber for forming flat glass including a threshold member, side members, a roof and a metering member wherein the combination provides a substantially horizontal path for delivering molten glass, the improvement comprising:



a single metering member having a smoothly contoured bottom surface, which in combination with the threshold member provides a channel through which molten glass may flow, the channel being composed of marginal edge portions and a center portion and being larger near said side members than near said center portion, and means for adjusting and maintaining the temperature of molten glass flowing between the threshold and the metering member comprising a plurality of discrete heaters mounted transversely within the delivery apparatus adjacent the furnace and spaced from the threshold, at least one of each of said heaters being positioned in a location above each marginal portion and said center portion of said channel, means for individually powering each of said heaters and means for individually controlling the power input to each said heater for varying the heat applied by said heaters to molten glass across the width of the channel.

3,973,941
METHOD OF PRODUCING A BLOWN BOTTLE HAVING MEANS DETERMINATIVE OF RELATIONSHIP BETWEEN THE BOTTLE BODY AND THE ANNULAR POSITION OF ASSOCIATED MEANS MOUNTED ON THE FINISH

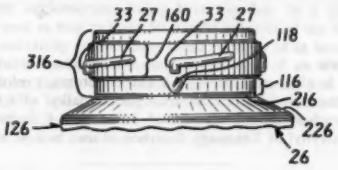
Joseph L. Augeri, Shelton, Conn., assignor to The Nestle Company Inc., White Plains, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,281
Int. Cl.² C03B *9/14, 9/40*
U.S. Cl. 65—79 4 Claims

1. A method of producing a hollow bottle having a mouth-defining finish adapted to receive and carry closure means,

such as a cap, in a particular annularly oriented position thereon, comprising

1. moulding a parison and a finish thereon in a parison forming and ring moulding means with the formation on the finish of physically engageable orientation guidance means at a predetermined annular location that will be related in an intended manner to the closure means oriented position and whereby it will subsequently serve to be physically engageable with complementary orientation guidance means of additional moulding equipment and thereby dictate the desired relative annular orientation thereof;



2. transferring the parison and its finish with the latter carrying its orientation guidance means to a forming mould having a body portion cavity receiving the parison to shape the bottle body therein and with the finish orientation guidance means engaging a complementary orientation guidance means at a particular annular location in the mouth of this mould cavity; and
3. while maintaining the engagement of the pair of complementary orientation guidance means moulding the parison in this body portion cavity into the hollow bottle, whereby the latter and the closure means when mounted on the finish in its particularly desired oriented position are annularly oriented relative to each other in the desired manner.

3,973,942

METHOD OF MOULDING AND TEMPERING GLASS ARTICLES

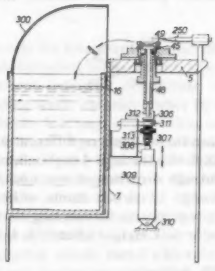
Ernesto Coen, Southport; Joseph Parry, Lowton, and Robin Charles Steere, Ormskirk, all of England, assignors to Pilkington Brothers Limited, St. Helens, England

Continuation of Ser. No. 406,851, Oct. 16, 1973, abandoned. This application Apr. 4, 1975, Ser. No. 565,223

Claims priority, application United Kingdom, Oct. 20, 1972, 48446/72; May 16, 1973, 23379/73

Int. Cl.² C03B *11/00*

U.S. Cl. 65—83 **18 Claims**



1. In a method of press moulding a glass article by feeding a gob of molten glass into an open mould, closing the mould to form the article to the required shape, opening the mould after forming the article, removing the article from the open mould when it has cooled to a desired condition, and then further cooling the article after removal from the mould, the improvement of reducing the time of moulding the article comprising:

regulating the temperature of the mould and time of closure of the mould so that moulding to form the article to the required shape is complete while the moulded glass is in a state of thermal inhomogeneity such that the viscosity of the glass of the surface of the moulded article is at most $10^{10.5}$ poises and the viscosity of the glass at the center of the thickness of the article is at most 10^{9} poises and substantially less than that at its surface;

opening the mould and rapidly transferring the article, while the surface viscosity and viscosity at the centre of thickness of the article are substantially different such that the article still has thermal inhomogeneity, directly into a cooling medium, avoiding forces which cause deformation of the shaped article during its transfer from the mould into the cooling medium, said transfer of the thermally inhomogeneous article being accomplished while the surface viscosity of the article is at least $10^{8.6}$ poises and at most $10^{10.8}$ poises and substantially greater than at its center of thickness; and

regulating the heat transfer from the article to the cooling medium to cool the article rapidly to a temperature at which its surface viscosity is at least $10^{12.5}$ poises.

3,973,943

APPARATUS FOR SUPPORTING SHAPED GLASS SHEETS FOR TEMPERING

Samuel L. Seymour, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 12, 1975, Ser. No. 558,050

Int. Cl.² C03B *27/00*

U.S. Cl. 65—348 **10 Claims**

1. Apparatus for supporting a hot shaped glass sheet for cooling comprising an outline support rail of rigid metal having an outline slightly inboard of that of said shaped glass sheet and a bar of non-metallic, rigid, fiber-reinforced, resin material having a lower heat transfer coefficient than that of said rigid metal rail mounted on said rigid metal rail in position to conform to said outline, said bar having an upper edge portion disposed above the upper edge of said rigid metal rail in position to provide a glass sheet engaging surface in spaced relation above said upper edge of said rigid metal rail and having sufficient of its dimension below said upper edge portion in side by side relation to said rigid metal rail to have its structural rigidity reinforced by said rail.

3,973,944

PEST CONTROL AGENT

Dietrich Erdmann; Gerhart Schneider, and Wolfgang Koch, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Dec. 15, 1970, Ser. No. 98,442

Claims priority, application Germany, Dec. 27, 1969, 1965134

Int. Cl.² A01N *9/00*

U.S. Cl. 71—88 **9 Claims**

1. A composition for controlling undesired plant growth comprising, as an active ingredient a herbicidal effective amount of 3-cyano-4-phenyl-5-dimethylaminomethylene-5H-

furanone-(2) in admixture with a finely divided inert insoluble solid carrier vehicle.

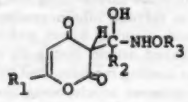
3,973,945

PYRAN-2,4-DIONE DERIVATIVES

Akiharu Fujino, Zushi; Isao Iwataki, Odawara, and Yoshihiko Hirono, Hiratsuka, all of Japan, assignors to Nippon Soda Company Ltd., Tokyo, Japan

Filed Nov. 25, 1974, Ser. No. 526,746
Claims priority, application Japan, Dec. 5, 1973, 48-135274
Int. Cl.[2] A01N 9/20; C07D 309/38
U.S. Cl. 71—88 6 Claims

1. A compound of the formula



wherein R_1 and R_2 are alkyl having six or less carbon atoms, R_3 is selected from the group consisting of alkyl having six or less carbon atoms and alkenyl having six or less carbon atoms, with the proviso that R_1 and R_2 do not both represent a methyl group.

4. A method for the control of weeds comprising applying a compound of claim 1 in an amount sufficient to exert herbicidal action to a locus to be protected.

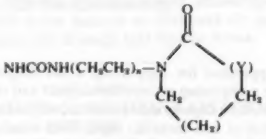
3,973,946

SUBSTITUTED-3-PHENYL UREAS

Edward Koon Wah Wat, Wilmington, Del., assignor to E. I. DuPont de Nemours & Company, Wilmington, Del.

Division of Ser. No. 354,871, April 25, 1973, Pat. No. 3,859,301. This application Nov. 20, 1974, Ser. No. 525,673
Int. Cl.[2] C07D 239/04, 233/02; A01N 9/22
U.S. Cl. 71—92 3 Claims

1. A compound of the formula



wherein

X = F or OCH_3

Y = NH

m = 0, 1 or 2

n = 0 or 1.

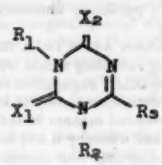
3,973,947

1,3,5-TRIAZINEDIONES AND THEIR USE AS SELECTIVE HERBICIDES

Julius Jakob Fuchs, Wilmington, and Kang Lin, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

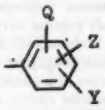
Division of Ser. No. 301,853, Oct. 30, 1972, Pat. No. 3,855,219, which is a continuation-in-part of Ser. No. 268,767, July 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 181,202, Sept. 16, 1971, abandoned. This application Aug. 20, 1974, Ser. No. 499,045
Int. Cl.[2] A01N 9/22, 9/12
U.S. Cl. 71—93 3 Claims

1. The method of controlling weeds in crops comprising applying to the locus of the crop a herbicidally effective amount of a compound of the formula:



wherein

R_1 is alkyl of 1 through 8 carbon atoms, cycloalkyl of 3 through 8 carbon atoms, cycloalkylalkyl of 4 through 7 carbon atoms, alkenyl of 3 through 4 carbon atoms, alkynyl of 3 through 4 carbon atoms, benzyl, or



where

Y is hydrogen, halogen, alkyl of 1 through 4 carbon atoms, nitro, alkoxy of 1 through 4 carbon atoms, alkylthio of 1 through 4 carbon atoms, cyano, or trifluoromethyl; and

Z is hydrogen, halogen, methyl, ethyl, nitro, alkoxy of 1 through 4 carbon atoms, or alkylthio of 1 through 4 carbon atoms; and

Q is hydrogen, halogen, or methyl;

R_2 is hydrogen, or a group

where A is alkyl of 1 through 3 carbon atoms or alkoxy or alkylthio of 1 through 4 carbon atoms, or a cation selected from lithium, sodium, potassium, calcium, magnesium, barium, or

where

R_5, R_6 and R_7 can be the same or different and each can be hydrogen, alkyl of 1 through 4 carbon atoms, or hydroxy alkyl of 2 through 4 carbon atoms; and R_8 is hydrogen, alkyl of 1 through 12 carbon atoms, or benzyl; R_5 and R_6 can be taken together to form a ring that is $-(CH_2)_2-O-(CH_2)_2-$ or $-(CH_2)_n-$ where n is 4–6 and R_7 and R_8 are H;

R_3 is SR_4 or OR_4 where

R_4 is alkyl of 1 through 6 carbon atoms, cycloalkyl of 3 through 6 carbon atoms, alkenyl of 3 through 4 carbon atoms, alkynyl of 3 through 4 carbon atoms, or benzyl, and

X_1 and X_2 are oxygen or sulfur.

3,973,948

FREE FLOWING POWDER AND PROCESS FOR PRODUCING IT

John M. Laferty, Jr., Wheat Ridge, Colo.; Joseph E. Ritsko, Towanda, and David J. Port, Athens, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 414,976, Nov. 12, 1973, abandoned. This application July 10, 1975, Ser. No. 594,734

Int. Cl.[2] C23B *3/00, 3/04*

U.S. Cl. 75—.5 AB 6 Claims

1. A free flowing flame spray powder consisting essentially of particle agglomerates of finely divided particulates, said particulates comprising at least one element selected from the group consisting of molybdenum and tungsten, the subparticles of the agglomerates being held together by a binder, characterized in that at least 50 weight percent of the binder consists essentially of the spray dried product of at least one water soluble metallic ammonium complex of an element selected from the group consisting of molybdenum and tungsten, whereby upon heating in a reducing atmosphere the spray dried product of the ammonium complex decomposes to base metal and at least one volatile product.

3,973,949

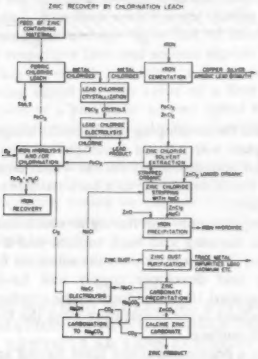
ZINC RECOVERY BY CHLORINATION LEACH

Duane N. Goens, and James E. Reynolds, both of Golden, Colo., assignors to Cyprus Metallurgical Processes Corporation, Los Angeles, Calif.

Filed Feb. 13, 1975, Ser. No. 549,728

Int. Cl.[2] C22B*3/00*; C01G *9/00*

U.S. Cl. 75—112 27 Claims



26. In the process for treatment of materials containing zinc and other metals including lead, copper, silver, iron and trace metals, the process including conversion of the metals to chlorides including ferric chloride either by wet chlorination with ferric chloride leaching or dry chlorination to form a leach solution followed by recovery of lead from, the leach solution by crystallizing the lead as lead chloride, removal of copper, silver, and trace metals from the leach solution, reducing substantially all of the ferric chloride in the leach solution to ferrous chloride, ultimately precipitating zinc from the leach solution as zinc carbonate with alkali metal carbonate and electrolyzing alkali metal chloride formed by the precipitation of zinc carbonate with alkali metal carbonate to produce chlorine gas which is returned to leaching and alkali metal hydroxide which is converted to alkali metal carbonate and the latter cycled to the zinc carbonate precipitation step, the improvement which comprises: recovering zinc chloride from the lead, copper, silver and trace metal depleted leach solution prior to zinc carbonate precipitation with an extraction agent selective for zinc chloride dissolved in an immiscible organic solvent, and stripping the zinc chloride from the extraction with an alkali metal chloride stripping solutions from the electrolytic cell through which the alkali metal chloride solution from the zinc carbonate precipitation step is passed for removal from it of excess chlorine ion picked up in the stripping.

3,973,950

LOW CARBON CALCIUM-SULFUR CONTAINING FREE-CUTTING STEEL

Tetsuro Itoh, Tohkai; Tetsuo Takahashi, Nagoya, and Kiyoichi Yamano, Tohkai, all of Japan, assignors to Daido Seiko Kabushiki Kaisha, Nagoya, Japan

Filed Sept. 12, 1975, Ser. No. 612,946

Claims priority, application Japan, Sept. 17, 1974, 49-107326

Int. Cl.[2] C22C *38/60*

U.S. Cl. 75—123 D 16 Claims

1. A low-carbon calcium-sulfur containing free-cutting steel, which consists essentially of 0.03 to 0.10% carbon, up to 0.3% silicon, 0.8 to 1.5% manganese, 0.04 to 0.10% phosphorus, 0.20 to 0.45% sulfur, and 0.0003 to 0.0050% calcium, 0 to 0.25% lead, 0 to 0.10% telurium, 0 to 0.15% bismuth, 0 to 0.2% tin, 0 to 0.2% zinc, 0 to 0.2% arsenic, 0 to 0.2% thallium, and the remainder being iron and impurities; and which may contain copper, nickel chromium and nitrogen as impurities; wherein the content of carbon, silicon, manganese, phosphorus, sulfur, copper, nickel, chromium and nitrogen is regulated within the above ranges so that the value of theoretical Brinell hardness (BHN) of the steel matrix defined by the formula:

$$BHN = 70 + 230[\%C] + 560[\%N] + 112[\%P] + 33[\%Si] + 23[\%Mn] + 8[\%Ni] + 8[\%Cu] + 7[\%Cr] - 39[\%S]$$

falls in the range of 110 to 130; and, wherein the said steel contains in the range of from 100 to 500 grams per steel-ton of oxide inclusions principally of type JIS -A2 (ASTM-C) softening or fusing at a temperature not higher than 1400℃.

3,973,951

HIGH TOUGHNESS AND WEAR-RESISTANCE STEEL

Kazuyoshi Satsumabayashi, Nagaokakyo, and Kiyoshi Mano, Hirakata, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Leverkusen, Japan

Filed Feb. 11, 1975, Ser. No. 548,992

Claims priority, application Japan, Feb. 12, 1974, 49-16268

Int. Cl.[2] C22C *38/34*

U.S. Cl. 75—126 Q 3 Claims

1. A high toughness and wear-resistance steel consisting of, by weight percent based on the weight of said steel, 0.25 to 0.38 of carbon, 1.60 to 2.60 of silicon 0 – 0.8 of manganese, 0 – 0.03 of phosphorus, 0 – 0.03 of sulphur, 3.0 to 6.0 of chromium and a balance of Fe.

3,973,952

HEAT RESISTANT ALLOY CASTING

Clarence George Bieber, West Milford; John Raymond Mihalisin, North Caldwell, both of N.J., and John Joseph Galka, Tuxedo Park, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed June 11, 1973, Ser. No. 368,689

Int. Cl.[2] C22C *19/05, 1/04*; C22F *1/10*

U.S. Cl. 75—171 16 Claims

1. A cast article composed of an alloy comprising 5% to 9% chromium, 7.5% to 12% tungsten and 1% to 4% molybdenum with the total of tungsten-plus-molybdenum not greater than 14% and the total of chromium-plus-tungsten-plus-molybdenum not greater than 20%, 7% to 16% cobalt, 3% to 6% tantalum, 2.5% to 5% aluminum and 2.5% to 5% titanium with the total of aluminum-plus-titanium being 6.5% to 8.5%,

0.01% to 0.2% carbon, 0.01% to about 0.2% zirconium, 0.01% to about 0.1% boron, up to about 3% hafnium, up to about 2% columbium, up to about 2% iron, up to about 1% vanadium, up to 0.02% yttrium and balance essentially nickel in an amount comprising at least 50% of the alloy and characterized, after a double heat treatment comprising heating at least one hour at 1975°F. to 2200°F., air cooling, thereafter heating at least 12 hours at 1500°F. to 1600°F., and air cooling, by a stress rupture life of at least 20 hours at 29,000 pounds per square inch and 1850°F.

3,973,953

IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT

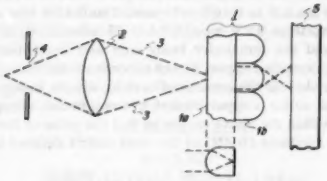
Anthony J. Montgomery, London, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1973, Ser. No. 429,243

The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.

Int. Cl.² G03G *16/00*

U.S. Cl. 96—1 R 8 Claims



1. A method for extending the dynamic range of an imagewise exposure system comprising the steps of:

a. providing a photosensitive member; and

b. imagewise exposing said photosensitive member to activating electromagnetic radiation through a lenticular lens element out of focus with said photosensitive member, said lenticular element comprising two angularly displaced layers of cylindrical lens arrays and providing on said photosensitive member during said imagewise exposure a soft dot pattern wherein about 75% of the photosensitive member area under each lenticule receives shadow information at a density of about 25% of the highlight information density received by the central about 25% of the photosensitive imaging member area under each lenticule.

3,973,954

IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT

Lloyd F. Bean, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1973, Ser. No. 429,253

The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.

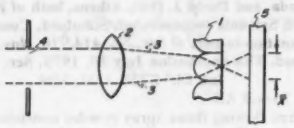
Int. Cl.² G03G *16/00*

U.S. Cl. 96—1 R 8 Claims

1. A method for extending the dynamic range of an imagewise exposure system comprising the steps of:

a. providing a photosensitive imaging member; and

b. imagewise exposing said photosensitive imaging member to activating electromagnetic radiation through a lenticular lens array out of focus with said photosensitive imaging member; said lenticular lens providing on said photosensitive imaging member during said imagewise exposure a soft dot pattern wherein about 75% of the photosensitive imaging member area under said lenticule receives shadow information at a density of about 25% of the highlight information density received by the central



about 25% of the photosensitive imaging member area under each lenticule.

3,973,955

ELECTROSTATIC DEVELOPING METHOD

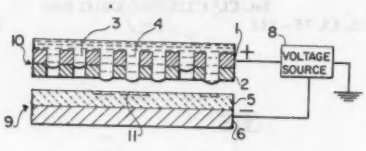
Genji Ohno, No. 26-37 Horiguchi, Kanazawa, Yokohama, Kanagawa, and Eiichi Inoue, 34-16 Minamikarasuyama 5-chome, Setagaya, Tokyo, both of Japan

Division of Ser. No. 233,546, March 10, 1972. This application Jan. 29, 1974, Ser. No. 437,706

Claims priority, application Japan, Mar. 29, 1971, 46-17941; Mar. 29, 1971, 46-17943

Int. Cl.² G03G *13/10*

U.S. Cl. 96—1 LY 12 Claims



1. A method for developing electrostatic images on a photoconductive plate with a liquid developer containing a coloring material in an aqueous liquid carrier which comprises:

providing liquid developer to a back surface of a developer supply unit;

said developer supply unit having an electrically conductive substrate forming said back surface and a repellent surface layer 3–400μ thick over the substrate forming a front surface, said developer supply unit having uniformly closely spaced 10–100μ pores in the conductive substrate and repellent layer penetrating from the front surface to the back surface;

contacting a photoconductive plate having an electrostatic pattern thereon with the front surface of the developer supply unit;

applying an electrostatic voltage of about 30V to 2000V between the developer supply unit and the photoconductive plate;

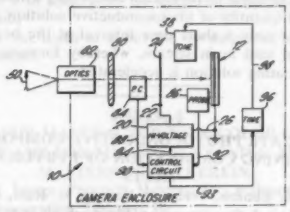
said surface layer comprising a material forming a surface tension contact angle more than 90° with the liquid developer but decreasing the contact angle to less than 90° when a voltage is applied between said developer supply unit and said photoconductive layer;

whereby the liquid developer, which is prevented from further permeating at the boundary between the liquid repellent layer and the conductive substrate in the pores of the developer supply unit, is exposed to an electrostatic field controlled by the electrostatic pattern on the photoconductive plate to decrease the contact angle with the inside surfaces of the pores of the liquid repellent layer to less than 90° and the liquid developer exudes through the pores onto the surface of the developer supply unit to be brought in contact with the photoconductive plate.

3,973,956
ELECTROPHOTOGRAPHIC PROCESS EMPLOYING SIGNAL COMPARISON

Manfred R. Kuehnle, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Division of Ser. No. 397,309, Sept. 14, 1973, Pat. No. 3,864,035. This application Nov. 25, 1974, Ser. No. 526,844
Int. Cl.² G03G 13/02, 13/24
U.S. Cl. 96—1 R 13 Claims



1. The method of making a visible image on an electrophotographic film member having a photoconductive coating which comprises:

A. exposing the coating to a substantially still light pattern for a time period,

B. simultaneously charging the coating during exposure and for the same period of time with a potential having a rising characteristic and at a rate which results in a net excess of charge distributed over the coating corresponding in variation to the light pattern at the end of the said charging and exposing period,

C. sensing the absolute potential of the surface charge on said coating at a dark area thereof during the charging and sensing the average light flux of said pattern and deriving respective first and second signals therefrom,

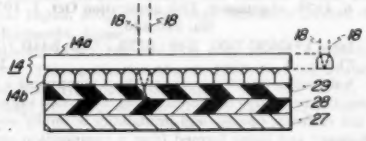
D. comparing the signals and deriving from said comparison a triggering signal for any value of a first signal which corresponds to a particular second signal in accordance with a predetermined relationship when the first signal reaches said value,

E. sequentially disabling the charging when the triggering signal is produced to establish the end of said time period and immediately toning the photoconductive coating for a length of time which is required to produce an observable visible image.

3,973,957
IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT

Anthony J. Montgomery, London, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1973, Ser. No. 429,445
The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.
Int. Cl.² G03G 16/00
U.S. Cl. 96—1.1 10 Claims



1. A method of increasing the sensitivity and speed of a deformation imaging system comprising the steps of:

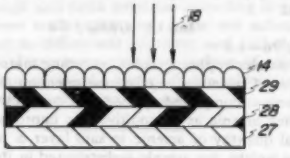
a. providing a deformation imaging member comprising a photoconductive layer in contact with a deformable layer of resonant frequency f_R, said deformable layer having a substantially uniform electric field thereacross; and

b. imagewise exposing said imaging member to activating electromagnetic radiation through a lenticular lens element adjacent but out of contact with the surface of said imaging member and in optical focus with the surface of said photoconductive layer in contact with said deformable layer; the ratio of lenticules per millimeter in said lens element to said resonant frequency being from about 1:2 up to less than 1:1 said lenticular element comprising two layers of lens arrays displaced at an angle greater than zero and having cylindrical lenses having a resolution sufficient to focus the electromagnetic radiation into a sharp relatively high intensity dot pattern during said imagewise exposure.

3,973,958
METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT

Lloyd F. Bean, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1973, Ser. No. 429,446
The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.
Int. Cl.² G03G 16/00
U.S. Cl. 96—1.1 10 Claims



1. A method of increasing the sensitivity and speed of a deformation imaging system comprising the steps of:

a. providing a deformation imaging member comprising a photoconductive layer in contact with a deformable layer of resonant frequency f_R, said deformable layer having a substantially uniform electric field thereacross; and

b. imagewise exposing said imaging member to activating electromagnetic radiation through a lenticular lens array adjacent but out of contact with the surface of the imaging member and in optical focus with the surface of the photoconductive layer in contact with said deformable layer, the ratio of lenticule per millimeter in said lens array to said resonant frequency being from about 1:4 up to less than 1:1, said lenticular array comprising lenses having a resolution sufficient to maintain the optical focus during said imagewise exposure.

3,973,959
ELECTROPHOTOGRAPHIC RECORDING MATERIAL AND PROCESS FOR ITS MANUFACTURE

Jürgen Rochlitz, Breckenheim, and Wolfgang Wiedemann, Geisenheim-Johannisberg, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Apr. 25, 1973, Ser. No. 354,191
Claims priority, application Germany, Apr. 26, 1972, 2220408
Int. Cl.² G03G 5/02
U.S. Cl. 96—1.5 9 Claims

1. An electrophotographic recording material consisting of an electroconductive support material and a photoconductive double layer of organic materials which consists of a homogeneous, opaque charge carrier producing dyestuff layer, prepared by vacuum evaporation of the dyestuff onto the support

material, the dyestuff being selected from the group consisting of Indanthrene Blue, decacyclene, Indanthrene Brilliant Violet RK, Cibanone Yellow GC, Indanthrene Red F3B, Indanthrene Navy Blue R, Ciba Orange G, trifluoromethylaminoacridone, 2-(p-dimethylaminobenzal)-indanedione-1,3, 2-5-bis-(piperonal)-cyclopentanone-1, 2,5-bis-(3,4-dimethoxybenzal)-cyclopentanone-1, 2,5-bis-(p-diethylaminobenzal)-cyclopentanone-1, Celliton Yellow 3GE, Celliton Yellow 7G and Indanthrene Gold Orange GG, and a transparent top layer of insulating material with at least one charge transporting compound, said top layer consisting of a mixture of a charge transporting, monomeric, heterocyclic compound selected from the group consisting of oxazoles, oxdiazoles, triazoles, imidazoles and pyrazoles, substituted by at least one dialkylamino group or two alkoxy groups and having an extended π-electron system, and a binder in the ratio by weight of about 1 : 1, the dyestuff layer having a thickness of about 0.005 to 2 microns and the transport top layer having a thickness of about 5 to 20 microns.

3,973,960
ELECTROPHOTOGRAPHIC ELEMENT HAVING A SELENIUM LAYER CONTAINING ARSENIC IN VARYING CONCENTRATIONS ACROSS THE LAYER THICKNESS

Hartmut Dulken; Gottfried Guder, and Karl-Heinz Kassel, all of Belecke, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 1, 1974, Ser. No. 438,707

Claims priority, application Germany, Feb. 3, 1973, 2305342

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **11 Claims**

1. In an electrophotographic recording material composed of a layer of selenium, at least one selenium alloy or at least one selenium compound applied to a conductive carrier and containing arsenic as an additive, the improvement wherein the total quantity of arsenic in said layer is between 1 and 20%, by weight, the arsenic is distributed in the layer with a concentration gradient such that the concentration of arsenic decreases from the free surface of the layer in the direction toward the carrier, and the arsenic concentration at the free surface is at least 13% by weight.

3,973,961
PROCESS AND APPARATUS FOR THE MANUFACTURE OF A SERIES OF PHOTOCONDUCTOR WEBS

Joachim Strőszynski, Naurod, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 6, 1975, Ser. No. 584,692

Int. Cl.² G03G *5/04;* **B05C** *3/02*

U.S. Cl. 96—1.5 **5 Claims**

1. A process for the manufacture of a series of photoconductor webs spaced apart from each other on a carrier web by electrically conductive spacing strips extending transversely of the carrier web, comprising the steps of:

a. transporting a carrier web having an electrically conductive surface disposed thereon in a feed direction across a backing member and in close proximity to a slot die arranged transversely to said feed direction;

b. pumping a photoconductive coating solution into said slot die;

c. flowing said photoconductive solution intermittently from the orifice of said slot die onto said carrier web for periods of time sufficient to produce said spaced photoconductor webs, the flow of said coating solution being substantially uniform during each coating period and the entire quantity of coating solution required for each coated photoconductor web being extruded from said slot die orifice in the form of a substantially uniform stream;

d. maintaining the distance between the carrier web and the die orifice constant and at such a small magnitude that the coating solution issuing from the die orifice forms a bridge between the orifice of the slot die and the carrier web; and

e. drying the coated carrier web.

2. The process as defined in claim 1, wherein said step of flowing the photoconductive solution from the slot die comprises extruding from said slot die for each quantity of photoconductive solution required for one photoconductor web section a main stream and a secondary stream said main stream said main stream being extruded as a uniform stream over the entire coating period for one photoconductor web section and said secondary stream comprising a minor porportion of said quantity of photoconductive solution and being extruded for only a short time interval at the beginning of extrusion of said main stream, whereby formation of said bridge of coating solution is accelerated.

3,973,962
AGGREGATE PHOTOCONDUCTIVE COMPOSITION CONTAINING COMBINATION OF PYRYLIUM DYE SALTS

Lawrence E. Contois, Webster; Norman G. Rule, Rochester, and William J. Staudenmayer, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 2, 1974, Ser. No. 466,110

Int. Cl.² G03G *5/09, 5/06*

U.S. Cl. 96—1.6 **7 Claims**

1. An aggregate photoconductive composition comprising a continuous electrically insulating film-forming polymer phase and at least one discontinuous phase dispersed in said continuous phase, said discontinuous phase comprising a particulate co-crystalline complex of (i) at least one electrically insulating film-forming polymer having an alkylidene diarylene group in the recurring unit thereof, (ii) at least one pyrylium dye salt having a non-light absorbing anion, and (iii) at least one pyrylium dye salt having a colored organo or organo-metallic anion of a strong acid having a pKa of less than about 3.5, said colored anion exhibiting a light absorption maximum within the range of from about 400 to about 700 nm, said particulate complex having a particle size within the range of from about 0.01 to about 25 microns and said complex comprising a weight ratio of said pyrylium dye salt labelled (ii) to said pyrylium dye salt labelled (iii) within the range of from about 1:1 to 9.8:1, said composition comprising a total amount of said pyrylium dye salts labelled (ii) and (iii) of from about 1 to about 50 percent by weight of said composition and said composition comprising an amount of said discontinuous phase sufficient to provide a maximum radiation absorption at a wavelength at least about 10 nm. different from the wavelength of maximum absorption for said dyes labelled (ii) and (iii) solubilized with said polymer labelled (i) in a homogeneous composition.

3,973,963
PHOTOGRAPHIC SUPPORT COMPRISING POLYMERIZED PROPYLENE, TALC, TITANIUM DIOXIDE, ELASTOMER AND ANTIOXIDANT

William J. Venor, Henrietta; John C. Hoppe, Spencerport, both of N.Y., and William W. Blount, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 309,304, Nov. 24, 1972, Pat. No. 3,874,880, which is a continuation-in-part of Ser. No. 90,053, Nov. 6, 1970, abandoned. This application Oct. 1, 1974, Ser. No. 510,880

Int. Cl.² G03C *7/00, 1/46;* **B23B** *27/00;* **B44D** *1/22*

U.S. Cl. 96—3 **2 Claims**

1. A diffusion transfer receiving sheet comprising a support having thereon a dye image-receiving layer, said support having the stiffness, opacity and printability normally associated with paper and being formed from a composition consisting essentially of

A. a film-forming crystalline polymer containing at least 80 percent by weight of polymerized propylene selected from the class consisting of:

1. a block copolymer of propylene with a least one other α-monoolefin selected from the group of
a. ethylene, and
α-monoolefin hydrocarbons of 4 to 10 carbon atoms;
2. mixtures of crystalline polypropylene and said block copolymer; and
3. polypropylene;
B. about 15 to about 40% by weight talc;
C. about 5 to about 15% by weight titanium dioxide pigment;
D. about 5 to about 20% by weight of a polyolefin elastomer; and
E. about one-tenth to about 1% by weight of a polyolefin antioxidant.

3,973,964
METHOD FOR MANUFACTURING A COLOR CATHODE RAY TUBE AND FOR MAKING SCREENING AND MASK MASTERS USED THEREIN

Howard G. Lange, Prospect Heights, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Dec. 23, 1974, Ser. No. 536,041
Int. Cl.² G03C *5/00*
U.S. Cl. 96—36.1 **16 Claims**

1. For use in screening the faceplate of a shadow mask-type color cathode ray tube, a method of making a working screening master, comprising:

providing a rigid, transparent, three-dimensionally curved prime master having a convex surface on which is disposed a precision prime master stencil pattern;

forming an intermediate screening master by providing a rigid, transparent intermediate master blank having a concave surface with curvature related to the curvature of said convex surface of said prime master, and photochemically transferring said pattern to the concave surface of said intermediate master blank, said transfer including illuminating a photosensitive coating on said concave surface of said intermediate master blank through said prime master with light which is actinic to said photosensitive coating and whose directional characteristic simulates that of electrons in the faceplate region of an end-product tube; and

forming a working screening master by providing a transparent working master blank having a convex surface with curvature related to the curvature of said concave surface of said intermediate master blank and photochemically transferring the pattern formed on said intermediate master blank to the convex surface of said working master blank, said transfer including illuminating a photosensitive coating on said convex surface of said working master blank through said intermediate master with light which is actinic to said coating and which is directed toward a location in space simulating the apparent center of electron beam deflection in an end-product tube.

3,973,965
MAKING SHADOW MASK WITH SLIT-SHAPED APERTURES FOR CRT

Takeshi Suzuki; Hiroshi Tanaka, and Makoto Kudo, all of Fukaya, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 364,255, May 29, 1973, Pat. No. 3,882,347. This application May 5, 1975, Ser. No. 574,638
Claims priority, application Japan, May 30, 1972, 47-53034; Aug. 21, 1972, 47-82832; Aug. 22, 1972, 47-83711
Int. Cl.² G03C *5/00*
U.S. Cl. 96—36.1 **2 Claims**

1. A method of preparing a shadow mask for a cathode ray tube, said shadow mask being provided with a multiplicity of vertically elongated slit apertures and disposed in spaced relationship with respect to said fluorescent screen,

said slit apertures being vertically spaced apart by transverse bridge elements, each of said slit apertures having a first pair of vertical side walls and a second pair of lateral side walls for defining the throat of said slit aperture, said throat being the most constricted opening defined by said aperture, said second pair of side walls defining said transverse bridge elements, each of said side walls comprising a portion inclined with respect to the surface of said mask facing said fluorescent screen and terminating at said throat, said inclined portions of said lateral side walls being so inclined as to locate the lateral portion of said throat substantially at the center of the thickness of said shadow mask between the surface of said mask facing said fluorescent screen and the surface thereof facing said guns at a longitudinal section along the longitudinal central axis of each of said slit apertures of said mask, said inclined portions of said vertical side walls being inclined to locate the vertical portion of said throat substantially closer than said lateral portion of the throat to said surface of said mask facing said guns,

comprising the steps of:

applying a film comprising a photosensitive resin onto first and second surfaces of a mask substrate to be used to form said shadow mask,

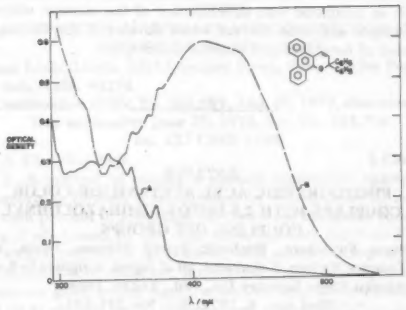
printing first and second dot patterns on the films on said first and second surfaces, the dots on said first and second patterns having rectangular configurations and overlying one another, the dot pattern rectangles of said first surface exposing a larger area than the dot pattern rectangles of said second surface,

etching through said mask substrate according to said dot pattern from both surfaces at a rate not substantially unbalanced to define said apertures and said throat in each of said apertures, said first surface of said mask substrate comprising the surface facing said screen, and said second surface facing said guns.

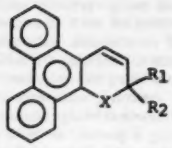
3,973,966
PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHROM-3-ENE

John B. Flannery, Webster, and Anita C. Van Laeken, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 8, 1974, Ser. No. 468,110
Int. Cl.² G03C *1/52*
U.S. Cl. 96—48 R **10 Claims**



1. A photochromic composition comprising a compound having the formula:



wherein X is selected from the group consisting of oxygen, sulfur and selenium; and wherein R_1 and R_2 are individually selected from the group consisting of a substituted or unsubstituted lower alkyl of 1–8 carbon atoms a phenyl group or a substituted phenyl group and a film forming resin.

3,973,967

PROCESSES UTILIZING PHOTOGRAPHIC ELEMENT CONTAINING A PHYSICAL DEVELOPMENT ACTIVATOR

Harry Lerner, Lexington, Mass., assignor to Itek Corporation, Lexington, Mass.

Division of Ser. No. 258,769, June 1, 1972, Pat. No. 3,862,843. This application Aug. 19, 1974, Ser. No. 498,505
Int. Cl.² G03C *5/24, 5/20*
U.S. Cl. 96—48 PD **7 Claims**

1. In a process for forming a metallic image on an element comprising a support having thereon a photosensitive material capable of generating physical development nuclei upon light exposure, said photosensitive material being contained in a layer of a first solvent permeable binder having a layer thickness of less than about 2 microns, said process comprises imagewise exposing said photosensitive material to light and subsequently physically developing said exposed photosensitive material with an aqueous physical developer having a ΔE of less than 100 millivolts and comprising a solution of silver ions, ferrous ions, ferric ions and an ionic surfactant, wherein the improvement comprises incorporating in said element a physical developer activator material comprising a complexing agent which preferentially forms complexes with the ferric ions in said physical developer, said activator material being contained in a layer of a second solvent permeable binder contiguous to said layer of a first solvent permeable binder and being present in sufficient amount to cause an increase in the rate of metal deposition or optical density of at least about 30% as compared with development of the element without developer activator therein when developed for the same period of time with said physical developer.

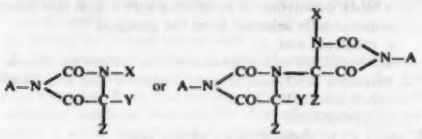
3,973,968

PHOTOGRAPHIC ACYL ACETANILIDE COLOR COUPLERS WITH 2,5-DIOXO-1-IMIDAZOLIDINYL COUPLING OFF GROUPS

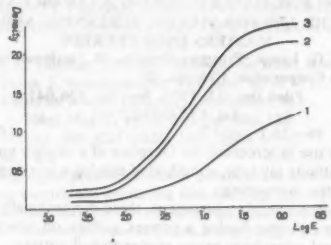
Mitsuto Fujiwhara, Hachioji; Syunji Matsuo, Fussa, and Tamotsu Kojima, Kokubunji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1972, Ser. No. 241,691
Claims priority, application Japan, Apr. 26, 1971, 46-26766
Int. Cl.² G03C *7/00, 1/40*
U.S. Cl. 96—56.5 **8 Claims**

3. A light-sensitive silver halide color photographic material which comprises a support and carried thereon an yellow color image-forming layer comprising a compound of the general formula



wherein A is a residue formed by removing one of the hydrogen atoms of the active methylene group of an active methylene group-containing yellow image-forming coupler of the acyl acetanilide type; X is a hydrogen atom, or an alkyl, acyl, carboxymethyl, alkoxycarbonylmethyl, carbamylmethyl, aryl, aralkyl, nitro or amino group; and Y and Z are individually a hydrogen atom, or an alkyl, ureido, aryl, aralkyl, benzylidene, styryl or anilino group.



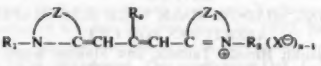
3,973,969

SILVER HALIDE PHOTOGRAPHIC EMULSION

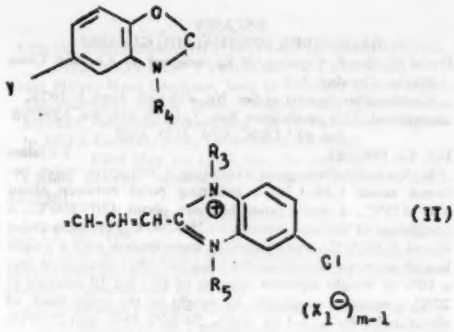
Keisuke Shiba; Masanao Hinata; Hirotetu Kato; Akira Sato, and Akira Ogawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 371,631, June 20, 1973, abandoned. This application May 2, 1975, Ser. No. 574,147
Claims priority, application Japan, June 21, 1972, 47-62117
Int. Cl.² G03C *1/14*
U.S. Cl. 96—124 **22 Claims**

1. A silver halide photographic emulsion containing a supersensitizing amount of at least one sensitizing dye represented by general formula (I);



wherein Z and Z_1 each represent the atoms necessary to complete a benzothiazole nucleus, naphthothiazole nucleus or benzoselenazole nucleus, R_3 represents a lower alkyl group of 1 – 4 carbon atoms, R_1 and R_2 each represents an alkyl group having at least one carboxyl group or an alkyl group having at least one sulfo group, at least one of R_1 and R_2 being an alkyl group having at least one sulfo group, X represents an anion forming a salt with a quaternary nitrogen atom in the cyanine dye, *n* represents 1 or 2, and, when *n*=1, the dye forms a betaine-like structure, and at least one sensitizing dye represented by the following general formula (II);



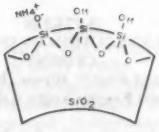
wherein R_3 represents a lower alkyl group of 1 – 4 carbon atoms or an allyl group, Y represents a halogen atom, R_4 represents an alkyl group (provided that when R_5 is an alkyl group containing at least one sulfo group, R_4 is not an alkyl group containing at least one sulfo group), R_5 represents an alkyl group containing at least one carboxyl group or an alkyl group containing at least one sulfo group, X_1 represents an anion forming a salt with a quaternary nitrogen atom in the cyanine dye, *m* represents 1 or 2, and, when *n=1*, the dye forms a betaine-like structure.

3,973,970

ADDITIVE COMPOSITION FOR MAKING DENTAL MATERIALS

Curtis P. Mabie, Thurmont, Md., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Jan. 7, 1975, Ser. No. 539,236
Int. Cl.² C09K *3/00*; C04B *33/00*
U.S. Cl. 106—35 **6 Claims**



1. In the method of making dental porcelain products, comprising making a paste of a liquid product and raw porcelain powder, compressing and firing to a temperature sufficient to bond the mixture into a mature porcelain, the improvement wherein said liquid product comprises a composition comprising an aqueous solution of a colloidal silica and/or alumina sol and a water soluble flux which is compatible with the colloid used.

3,973,971

METHOD FOR PREPARING AN IMPROVED CREOSOTE WOOD PRESERVATIVE FROM A COAL TAR CREOSOTE

Nicholas P. Greco, Pittsburgh, and David A. Webb, Valencia, both of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Filed Feb. 7, 1975, Ser. No. 547,859
Int. Cl.² C07C *37/36*; C09D *15/00*
U.S. Cl. 106—15 R **8 Claims**

1. A method of preparing an improved creosote wood preservative having a lighter color and reduced tendency for formation of a crud deposit on treated wood from a coal tar creosote, comprising:

a. refluxing the coal tar creosote with one or more of the neutral compounds selected from the group consisting of paraformaldehyde, nitrobenzene, nitrotoluene, tris (hydroxymethyl) nitromethane, aluminum, zinc and sulfur; and

b. distilling the refluxed creosote to an end temperature in the range of 395°–410°C. at atmospheric pressure and to produce a distillate as the improved creosote wood preservative.

3,973,972

GLASS CERAMIC AS FILLER IN POLYMERIZABLE DENTAL FILLING COMPOSITIONS

Gerd Muller, Mainz-Weisenau, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed Sept. 11, 1974, Ser. No. 505,146
Claims priority, application Germany, Sept. 21, 1973, 2347591
Int. Cl.² C03C *3/22*
U.S. Cl. 106—39.7 **10 Claims**

1. Particulate colorless, transparent glass ceramic having a particle size of 5–100 microns, having about 30–70% crystallinity by weight, a thermal expansion of less than $20 \cdot 10^{-7}\,°{-1}$ (0° – 50°C.) and exhibiting absorption for X-rays, said glass ceramic consisting essentially of, in percent by weight based on oxides:

SiO_2	40 – 55
Al_2O_3	15 – 25
P_2O_5	3 – 10
Li_2O	[5] 3 – 5
MgO	0 – 3
ZnO	0– 5
ZrO_2	2 – 7
Ta_2O_5	0 – 7
La_2O_3	[10] >12 – 20.

3,973,973

LIGHTWEIGHT AGGREGATE AND COMPOSITION AND METHOD OF MAKING SAME

Sam Leslie Leach, 32653 Seagate Drive, Palos Verdes Peninsula, Calif. 90274

Continuation of Ser. No. 284,589, Aug. 29, 1972, abandoned. This application June 27, 1974, Ser. No. 483,776
Int. Cl.² C04B *31/00*
U.S. Cl. 106—40 R **6 Claims**

1. A method of making a uniform lightweight aggregate comprising forming a composition by mixing from 80 to 99 weight percent of a material selected from the group consisting of silica sand, fly ash, clay, shale, and slate and from 20 to 1 weight percent of an additive, said additive comprising a combination of inorganic ingredients which decomposes to generate gases in four stages, in the first stage at temperatures of up to about 1500°F, in the second stage at 1550° to about 1650°F, in the third stage at from about 1650° to about 1800°F, and in the fourth stage at about 1800° to about 2250°F; pelletizing said composition; heating said composition in four stages, the first stage being up to about 1500°F, the second stage being from about 1550°F to about 1650°F, the third stage being from about 1650°F to about 1800°F, and the

fourth stage being from about 1800°F to about 2250°F, to thereby decompose said additive and generate gases and expand said material in said first stage; and to decompose the additive and generate gases which maintain said material in its expanded condition and to harden the expanded material in the remaining stages; and regulating the temperature in each of said heating stages to prevent said material from reaching the pyroplastic condition.

3,973,974

ALKALI RESISTANT GLASS COMPOSITIONS AND ALKALI RESISTANT GLASS FIBERS PREPARED THEREFROM

Koichiro Ohtomo, and Takuji Yoshimura, both of Osaka, Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed Mar. 18, 1975, Ser. No. 559,403

Claims priority, application Japan, Mar. 20, 1974, 49-32279; Oct. 21, 1974, 49-121788

Int. Cl.² C03C *13/00*

U.S. Cl. 106—50 **4 Claims**

1. An alkali resistant glass fiber comprising a glass fiber having a diameter of 5 to 50 microns and a glass composition consisting essentially of

SiO_2	55 to 69 mol%
ZrO_2	11.5 to 14 mol%
R_2O	12 to 23 mol%
B_2O_3	1 to 6 mol%
P_2O_5	1 to 5 mol%
$R'O$	0 to 0.3 mol%
TiO_2	0 to 1 mol%
M_xO_y	0 to 1 mol%

wherein R is an alkali metal, R′ is an alkaline earth metal, M_xO_y represents metal oxide impurities, wherein M is at least one metal selected from the group consisting of V, Cr, Mn, Fe, Co, Al, Cu, Zn, As, Y, Mo, Cd, Sn, Sb, Hf and Ce, x and y are positive integers with the proviso that the valence of M multiplied by x equals 2y, and when M_xO_y is MnO or ZnO, the total content of M_xO_y and R′O does not exceed 0.5 mol%, and the content of fluorides, calculated as F_2, does not exceed 0.5 mol%, said glass composition being such that the liquidus temperature (T_L) is more than 50°C. below the spinning temperature (T_F) at which the glass viscosity is 1,000 poises, said spinning temperature (T_F) being not higher than 1,320°C.

3,973,975

PbO-CONTAINING SEALING GLASS WITH HIGHER OXIDE OF A CATION TO AVOID PbO REDUCTION

Josef Francel; James E. King, both of Toledo, and John M. Woulbroun, Grand Rapids, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 246,316, April 21, 1972, abandoned, and a continuation-in-part of Ser. No. 511,202, Oct. 1, 1974, which is a continuation of Ser. No. 246,316, April 21, 1972, abandoned. This application Oct. 22, 1974, Ser. No. 516,900

Int. Cl.² C03C *3/04, 3/10*

U.S. Cl. 106—53 **98 Claims**

1. In a PbO-containing sealing glass frit for sealing two glass surfaces together, the improvement wherein the PbO in said sealing glass frit is unreduced when said sealing glass frit is fired in the presence of reducing conditions and at temperatures at which said sealing glass frit seals said glass surfaces together, said improvement comprising incorporating in said sealing glass frit a sufficient amount of a powder of a higher oxide of a cation which is stable at the temperatures at which said sealing glass frit seals said glass surfaces together and which can be reduced to a lower oxide of the cation when exposed to said reducing conditions, said lower oxide of said cation being compatible with the fired sealing glass, said higher oxide of said cation being selected from the group consisting of Pb_2O_4, BaO_2, MnO_2, Mn_2O_3, Fe_3O_4, CuO, Cu_2O, Tl_2O_3, TeO_2, Ta_2O_5, Nb_2O_5, V_2O_5, CeO_2 and Bi_2O_3.

3,973,976

HIGH INDEX OPHTHALMIC GLASSES

David C. Boyd, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 475,665, June 3, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 629,798

Int. Cl.² C03C *3/10, 3/30, 3/08*

U.S. Cl. 106—53 **2 Claims**

1. An ophthalmic glass exhibiting a refractive index between about 1.58–1.71, a softening point between about 630°–675°C., a strain point between about 450°–500°C., a coefficient of thermal expansion (25°–300°C.) between about 45–60 × 10^{-7}/°C., and no surface imperfection with a weight loss of no more than about 0.03 mg/cm² after immersion into a 10% by weight aqueous solution of HCl for 10 minutes at 25°C. consisting essentially, by weight on the oxide basis, of about 3–7% B_2O_3, 3–11% Al_2O_3, 30–60% PbO, and 27–55% SiO_2.

3,973,977

MAKING SPINEL AND ALUMINUM-BASE METAL CERMET

Lois E. Wilson, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 411,947, Nov. 1, 1973. This application Oct. 6, 1975, Ser. No. 619,675

Int. Cl.² C04B *35/44*

U.S. Cl. 106—62 **4 Claims**

1. A method of making a dense, coherent, substantially homogeneous cermet composition of matter composed essentially of, on a weight basis, at least 60% magnesium aluminate spinel crystals, 0 to 10% alpha alumina crystals, 0 to 2% mullite crystals, 0 to 5% magnesium aluminum boride crystals and 10 to 30% aluminum-base metal phase, which method comprises

providing a mass of melted and solidified material consisting essentially of, analytically by weight, at least 65% being a base composition and 0 to 35% B_2O_3, the base composition consisting of 5 to less than 40% MgO, 5 to 43% Al_2O_3 and 35 to 85% SiO_2,

contacting the mass with molten aluminum-base metal maintained at temperature in the range of about 650° to 850°C. when the MgO content of the base composition is at least 8% and in the range of about 650° to 750°C. when the MgO content of the base composition is less than 8%,

maintaining the mass in contact with the molten metal for a time sufficient to effect reaction between the mass and the molten metal and to transform a substantial portion of the mass into the cermet composition.

3,973,978

METHOD FOR EXECUTION OF QUICK HARDENING CEMENT

Koji Nakagawa, and Kenkiti Hirano, both of Niigata, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 17, 1974, Ser. No. 480,067

Claims priority, application Japan, June 15, 1973, 48-67448

Int. Cl.² C04B *7/02, 7/355*

U.S. Cl. 106—95 **10 Claims**

1. A method for working quick hardening cements comprising preparing (a) a composition selected from the group consisting of a cement paste, mortar and concrete and (b) 10–50% by weight based on cement content of composition (a) of a composition selected from the group consisting of a powder composition of calcium aluminate and inorganic sulfate and a suspension composition of calcium aluminate and inorganic sulfate wherein the proportion of calcium aluminate: inorganic sulfate is 1:0.1 to 5 parts by weight, mixing the composition (a) and the composition (b) and casting the mixture immediately after the admixture.

3,973,979

COLOR PHOTOGRAPHIC MATERIALS CONTAINING DIFFUSION FAST PYRAZOLONE COUPLERS

Ernst Meier; Hans Glockner, both of Munich; Karl Kuffner, Unterhaching; Immo Boie, Cologne, and Karl-Wilhelm Schranz, Odenthal-Hahnenberg, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 14, 1974, Ser. No. 469,785

Claims priority, application Germany, May 19, 1973, 2325461

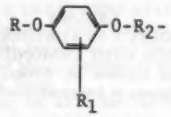
Int. Cl.² G03C *1/40*

U.S. Cl. 96—100 **10 Claims**

1. A light-sensitive color-photographic material which contains at least one silver halide emulsion layer and a pyrazolone coupler, characterized by having

a 5-pyrazolone coupler group to which is attached in the 1- or 3- position of the 5-pyrazolone coupler in a substituent of the pyrazolone coupler in its 1- or 3-position or as a substituent of the pyrazolone coupler in its 3-position

a hydroquinone diether group of the formula:



in which

R_2 represents an alkylene group, in which alkylene group one hydrogen may be substituted by an alkyl group and in cases where R_2 is attached to the 3-position or to one of the substituents in the 1- or 3-position of the pyrazolone coupler through a connecting member —OCONH—, the number of carbon atoms in the alkylene group is even,

R represents an alkyl or cycloalkyl group and

R_1 represents hydrogen or an alkyl group and wherein the substituents of the pyrazolone coupler in its 3-position are selected from the group consisting of alkyl, alkylamino, arylamino and acylamino and in its 1-position are selected from the group consisting of aryl and methyl substituted with carbamyl, phenyl or trifluoromethyl

and said pyrazolone coupler contains in its 3-position at least one of said 3-position substituents when the hydroquinone diether group is attached to the 1-position,

and said pyrazolone coupler contains in its 1-position at least one of said 1-position substituents when the hydroquinone diether group is attached to the 3-position.

3,973,980

PROCESS FOR THE HEAT TREATMENT OF MATERIAL IN DUST FORM

Rudolf Rohrbach; Gerhard Rohrbach, both of Dotternhausen, and Helmuth Y. Rechmeier, Balingen, all of Germany, assignors to Rudolf Rohrbach, Dotternhausen, Germany

Filed Dec. 18, 1973, Ser. No. 425,779

Claims priority, application Germany, Dec. 19, 1972, 2262213

Int. Cl.² C04B *7/02*

U.S. Cl. 106—100 **5 Claims**

1. A process for the heat treatment of components of a raw material in dust form so as to produce cement clinkers in an installation comprising a first and a second heat exchanger for preheating the raw material, a rotary kiln supplied with the combined preheated material from said heat exchanger, and a condenser for cooling the material delivered from said kiln, said process comprising the steps of:

1.

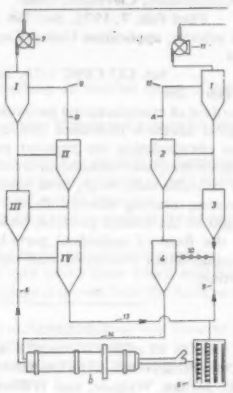
a. supplying a first component of the raw material to said first heat exchanger;

b. supplying a second component of the raw material to said second heat exchanger;

2.

a. supplying waste gases from said rotary kiln to said first heat exchanger for heating the raw material component therein; (b) supplying waste gases from said condenser to said second heat exchanger; (c) supplying additional fuel to a burner in said second heat exchanger;

d. conveying the heated first raw material component from said first heat exchanger into said heated second



heat exchanger for admixing with said second raw material component and the waste gases from said condenser; (e) subjecting said admixed raw material components and condenser waste gases to heat from said burner; and

3. carrying out substantially all endothermal process in said second heat exchanger with said admixed raw material components while producing in said rotary kiln only the heat quantity necessary for reaching and maintaining the process temperature.

3,973,981

PIGMENT COMPOSITIONS

Masayuki Miyatake; Sengo Ishizuka, and Takao Takagi, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

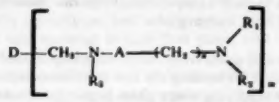
Filed Dec. 30, 1974, Ser. No. 537,220

Claims priority, application Japan, Aug. 7, 1974, 49-89850

Int. Cl.² C08K *5/00*; **C09D** *11/00*, *17/00*

U.S. Cl. 106—288 Q **11 Claims**

1. A pigment composition consisting essentially of as the base material a base organic pigment and as the additive the derivative of a starting organic pigment in the ratios by weight of 100 : 0.5–30, the base and starting organic pigments being different from, or identical with, each other and the derivative being represented by the following general formula



(I)

wherein D is the residue of the starting organic pigment, A is a carbonyl or sulfonyl group, R_1 and R_2 are each a hydrogen atom, non-substituted or substituted alkyl group containing 1–18 carbon atoms, cycloalkyl group, aryl group or heterocyclic residue, or they may form a ring, R_3 is a hydrogen atom or lower alkyl group, n is an integer of from 1 to 2 and m is an integer of from 1 to 4.

3,973,982

COATED PIGMENTS

John Francis Bingham, Stourbridge, England, assignor to Ferro Corporation, Cleveland, Ohio

Filed Feb. 7, 1975, Ser. No. 547,920

Claims priority, application United Kingdom, Aug. 6, 1974, 34642/74

Int. Cl.² C09C *1/20, 3/00*

U.S. Cl. 106—298 **15 Claims**

1. A method of manufacturing particulate chrome pigments having good abrasion resistance and color stability, which comprises encapsulating the pigment particles in a coating selected from the class consisting of aromatic carboxylic acids and their insoluble salts, singly or in combination, the amount of said coating totalling between about 1 to 50 percent of the total weight of the coated product, and recovering said pigment in the form of individual particles each having said coating composition overlaying and encapsulating said pigment particle.

3,973,983

CARBON BLACK PIGMENTS AND RUBBER COMPOSITIONS CONTAINING THE SAME

Merrill E. Jordan, Walpole, and William G. Burbine, Whitman, both of Mass., assignors to Cabot Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 95,981, Dec. 7, 1970, abandoned. This application Aug. 8, 1974, Ser. No. 495,814

Int. Cl.² C09C *1/48*

U.S. Cl. 106—307 **6 Claims**

1. A carbon black product characterized by having a total surface area of at least about 160 m^2/g, a value for the ratio of non-porous specific surface area to total surface area of the carbon black of at least 0.9, a value for the tint factor relationship of, wherein D_a is apparent diameter of less than 317, and a DBP absorption of at least 90 cc/100 gms of black.

3,973,984

CONTINUOUSLY OPERABLE SUGAR CENTRIFUGE

Volkmar Hentschel, Braunschweig, Germany, assignor to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

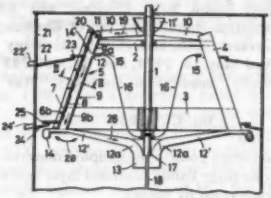
Filed Oct. 23, 1975, Ser. No. 624,738

Claims priority, application Germany, Nov. 26, 1974, 2455812

Int. Cl.² C13F *1/06, 1/10*

U.S. Cl. 127—19 **14 Claims**

1. In a continuously operable sugar centrifuge having a housing, screen means forming a rotational surface supported for rotation about a rotational axis in said housing, a drive shaft, means connecting said screen means to said drive shaft, massecuite supply means arranged to feed massecuite to said screen means and passage means leading to said screen means, the improvement comprising channel means as part of said screen means arranged symmetrically relative to said rotational axis, conduit means operatively connecting said channel means to said massecuite supply means to feed the massecuite to one end of said channel means, outwardly facing screen walls as part of said channel means, sugar discharge means including a sugar outlet operatively connected to the other



end of said channel means, and air inlet funnel means operatively connected to said sugar discharge means for facilitating the transport of the sugar to said sugar outlet.

3,973,985

STARCH PRODUCT BY FURTHER OXIDIZING OXIDIZED STARCH WITH AMMONIUM PERSULFATE

John E. Voigt, and Edward M. Bovier, both of St. Louis County, Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed June 3, 1974, Ser. No. 475,619

Int. Cl.² C13L *1/08*

U.S. Cl. 127—33 **12 Claims**

1. A process for preparing starch for use in paper coating compositions, comprising the steps of:

A. forming an aqueous slurry containing about 30 to about 43% by weight of an oxidized starch having a fluidity of about 10 to about 60 and a carboxyl number of 0.05 to about 0.2%, and

B. adding from about 0.1 to about 1% by weight based on the starch solids of ammonium persulfate as a secondary oxidizing agent to further modify the starch.

3,973,986

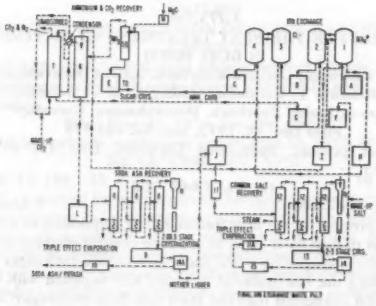
PROCESS FOR THE PURIFICATION OF SUGARBEET JUICE AND INCREASING THE EXTRACTION OF SUGAR THEREFROM

Karlheinz W. R. Schoenrock, and Hugh G. Rounds, both of Ogden, Utah, assignors to The Amalgamated Sugar Company, Ogden, Utah

Filed Mar. 26, 1975, Ser. No. 562,006

Int. Cl.² C13D *3/14*

U.S. Cl. 127—46 A **2 Claims**



1. A process for the exchange of sugarbeet juice cations which comprises treating said juice with a cation exchanger in the ammonium form;

adding to the sugarbeet juice thus treated sufficient active magnesium oxide or magnesium hydroxide to liberate and recover through distillation the ammonia from said juice;

regenerating said cation exchanger with a stoichiometric excess of a concentrated solution of ammonium carbonate representing 150–500% equivalents on the capacity of said cation exchanger;

stripping excess ammonium carbonate from the cation regeneration waste in a stripper by introducing the ammonia bearing vapors from said juice distillation into the stripper;

condensing the vapors from said stripper followed by recarbonating said condensed vapors in a carbonator with CO_2 gas to reconstitute the concentrated ammonium carbonate solution to be used for said cation exchanger regeneration; and

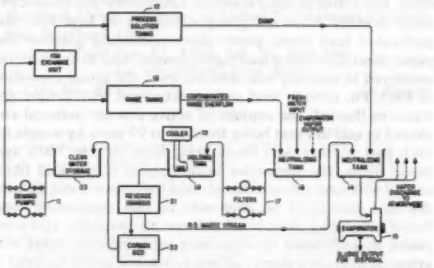
concentrating the bottom product from said stripper to recover said sugarbeet juice cations as their respective crystalline carbonates.

3,973,987

WATER RECYCLE TREATMENT SYSTEM FOR USE IN METAL PROCESSING

David Edward Hewitt, Hopkinton, and Thomas Joseph Dando, Southboro, both of Mass., assignors to Data General Corporation, Southboro, Mass.

Filed Mar. 18, 1974, Ser. No. 452,475
Int. Cl.² B08B 7/04
U.S. Cl. 134—12 **8 Claims**



1. In a system for processing a metal workpiece such as a printed circuit board, having at least two or more separate chemical process solution bath tanks and rinse tanks through which the workpiece is passed, a technique for water treatment and reuse where the volume of water flow through the rinse tanks is at least nine times the volume of water flow through the chemical process solution bath tanks comprising the steps of:

providing a first flow path for contaminated water, comprising of a contaminating element including metal build-up derived from said rinse tanks and a second flow path for contaminated solution including metal build-up derived from said chemical process bath tanks;

treating the contaminated water in the first flow path to separate the contaminating element from said rinse tank contaminated water to produce clean water;

routing the separated contaminating element and the contaminated solution in said second flow path into at least one (a) common neutralizing tank wherein said contaminating element is neutralized;

separating the neutralized contaminating element and contaminated solution, to provide water vapor and sludge outputs; and

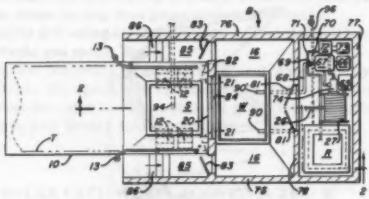
pumping said clean water back to said rinse tanks and process tanks.

3,973,988

TRAILER WASHING APPARATUS

Richard C. McMahan, P.O. Box 428, La Salle, Colo. 80645

Filed Jan. 17, 1975, Ser. No. 541,714
Int. Cl.² B08B 3/02; B60S 3/04; B60S 9/08
U.S. Cl. 134—46 **4 Claims**



1. Apparatus for washing an interior space of trailers and the like, comprising:

a carriage having support wheels and means for driving said wheels;

a rotatable nozzle means for causing an impingement of cleaning fluid on the inner surfaces of said trailer space;

means for rotating said nozzle means;

lateral rollers for spacing said carriage in the interior of said trailer;

a hose for supplying liquid to said nozzle means;

a reel exteriorly of said trailer from which said hose is unreeled as said carriage is moved from the back to the front of said trailer;

means for rotating said reel to cause said hose to pull said carriage rearwardly in said trailer;

a wash tank containing liquid for washing the interior surface of said trailer;

heating means for heating the liquid in said wash tank;

a rinse tank containing water for use in rinsing the interior of said trailer;

pumping means for pumping said washing liquid to said reel and said hose;

pumping means for pumping rinse water to said reel and to said hose;

an opening in a partition in a building containing said wash tank and said rinse tank;

resilient pads surrounding an opening in said partition; and

a downwardly sloped ramp on which said trailer may be placed with the rear end engaging said resilient pads, the slope of said ramp imparting a slope to the floor of said trailer so that wash water and rinse water applied to the interior of said trailer will flow down the floor of said trailer and into said wash tank.

3,973,989

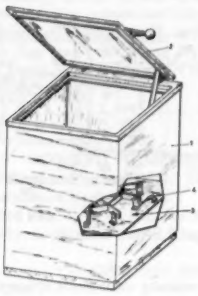
CLEANING MACHINE FOR METAL PARTS

Egon Senger, Hansastrasse 51, Rheine, Germany

Filed Feb. 7, 1975, Ser. No. 548,036
Int. Cl.² B08B 3/02
U.S. Cl. 134—141 **5 Claims**

1. A cleaning machine for metal parts, comprising a basket for holding the metal parts while they are contacted by a detergent liquid, a support for said basket, which support is rotatably mounted on a vertical axis, and at least one jet nozzle arranged to discharge a jet of fluid for rotating said support, wherein the improvement comprises a plurality of freely swingable vanes depending from said support, said vanes in their normal hanging positions being arranged to enter successively said jet of fluid so as to serve as inmpellers to rotate said support, and being pivoted to said support on

axis which are generally tangential, whereby the action of centrifugal force on said vanes causes them to swing upward



out of the path of said jet to limit the speed of rotation of said support.

3,973,990

GALVANIC CELL WITH SOLID FLUORIDE ION-CONDUCTIVE ELECTROLYTE

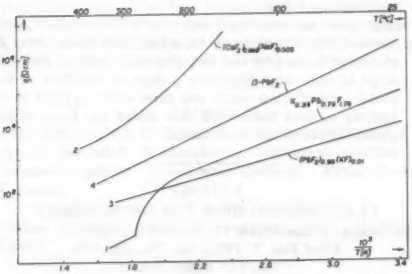
Waldemar Borger, Kelkheim, Taunus; Udo Hullmeine, Hofheim-Dbn, and Ernst Voss, Liederbach, all of Germany, assignors to Varta Batterie Aktiengesellschaft, Kelkheim, Taunus, Germany

Filed Jan. 13, 1975, Ser. No. 540,682

Claims priority, application Germany, May 25, 1974, 2425367; Jan. 12, 1974, 2401497

Int. Cl.² H01M *10/00*

U.S. Cl. 136—6 L **9 Claims**



1. A galvanic cell comprising positive and negative electrodes and a solid fluoride ion-conductive electrolyte having the formula $M_nPb_{1-n}F_{2-n}$ wherein M is at least one element selected from the group consisting of potassium and rubidium; Pb is selected from the group consisting of all lead and partly lead, partly metal more electropositive than lead; F is fluorine; and n is a positive value ranging from 0.001 to 0.6.

3,973,991

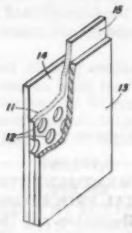
LIGHT-WEIGHT LEAD-ACID BATTERY WITH LAMINATED ELECTRODES

John P. Cestaro, Trenton, and Uriel Sokolov, Princeton, both of N.J., assignors to NL Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 330,316, Feb. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 251,935, May 10, 1972, abandoned. This application Mar. 5, 1975, Ser. No. 555,569

Int. Cl.² H01M *35/08*

U.S. Cl. 136—26 **2 Claims**



1. A laminated electrode containing three plies, the center ply being an electrically conductive sheet and the outer two plies each being a porous, compressed and sintered dry mat consisting essentially of a homogeneous mixture of synthetic fibers and active powder material, said electrically conductive sheet selected from the group consisting of lead foil, thin perforated lead sheet, paper sheet containing graphite and paper sheet containing lead metal powder, said active material employed in said dry mat selected from the group consisting of PbO, Pb, tribasic lead sulfate, tetrabasic lead sulfate and mixtures thereof, the amount of active powder material employed in said dry mat being from 50 to 99 parts by weight for each part of fiber, said fibers being from 90% to 100% synthetic fibers, the remainder being natural fibers, said fibers coated with said active material, said compressed and sintered dry mat positioned on each side of said conductive sheet forming a strong close bonded three ply laminate, said composite sheet formed by dispersing said fibers in water with agitation to form a slurry, adding powdered active material to said slurry and after thoroughly mixing, flocculating the dispersed slurry by lowering the pH until a large flocculated mass of fibers and active material is formed, filtering and drying said flocculated mass to form said composite sheet of a loose homogeneous mat of fibers coated with said active material, forming said laminated electrode by placing said composite sheet of said homogeneous mat of fibers coated with said active material on each side of a conductive sheet to form a sandwich and heating and compressing said sandwich at a temperature from 120°C. to 200°C. under pressure from atmospheric to 13000 psi to form said three-ply laminated electrode structure.

3,973,992

TUBULAR ELECTRODE

Hans Krug, Kelkheim, Taunus; Hans Niklas, Eppstein, both of Germany, and Rolf Thornblad, Hultsfred, Sweden, assignors to Varta Batterie Aktiengesellschaft, Hanover, Germany

Filed May 28, 1974, Ser. No. 473,409

Claims priority, application Germany, Sept. 24, 1973, 2347957

Int. Cl.² H01M *35/20*

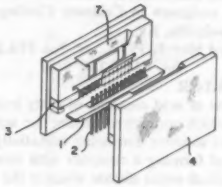
U.S. Cl. 136—55 **11 Claims**

1. The method of making a tubular electrode which electrode includes an array of grid spines and a yoke joining the ends of said spines through which the electrode current is taken off,

said method comprising the steps of:

forming a plurality of separate ones of said spines by extruding low antimony-content lead through a die;

arraying the separate spines to form a grid, with adjacent ends of the different spines protruding into the hollow interior of a casting mold conforming to the shape of the yoke;



filling the yoke-conforming interior of the mold with liquid low antimony-content lead, thereby to cast the yoke into the protruding spine ends; and

removing the spine array and cast-on yoke from the mold after hardening.

3,973,993

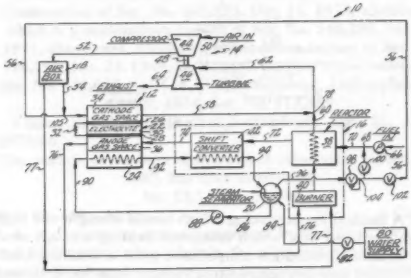
PRESSURIZED FUEL CELL POWER PLANT WITH STEAM FLOW THROUGH THE CELLS

David P. Bloomfield, and Michael B. Landau, both of West Hartford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 12, 1975, Ser. No. 549,596

Int. Cl.² H01M *8/04, 8/06*

U.S. Cl. 136—86 C **16 Claims**



1. A power plant for generating electricity and having a supply of water and a supply of hydrogen containing fuel for use therein comprising:

a fuel cell stack including a plurality of fuel cells connected electrically in series through a load, each cell comprising a cathode electrode, an anode electrode, an electrolyte disposed therebetween, a cathode gas space on the nonelectrolyte side of said cathode electrode and an anode gas space on the nonelectrolyte side of said anode electrode;

compressor means including a compressor operably connected to turbine means for compressing air to greater than two atmospheres pressure;

means for delivering air at a pressure of at least 2 atmospheres from said compressor into said cathode gas space;

fuel conditioning apparatus including reactor means for producing hydrogen from a hydrogen containing fuel;

burner means for providing heat to said reactor means;

means for delivering pressurized hydrogen containing fuel into said reactor means;

means for delivering at least a first portion of said anode effluent gases into said burner means for providing fuel to said burner means;

means for delivering pressurized hydrogen from said fuel conditioning apparatus into said anode gas space;

steam generating means operably associated with said stack for delivering water into heat exchange relationship with said stack for converting at least a portion of said water into steam unsing heat generated in said stack;

means for delivering at least a portion of said steam into said cathode gas space; and

means for delivering pressurized effluent gases from said cathode gas space and effluent gases from said burner means into said turbine means for powering said turbine means and driving said compressor.

3,973,994

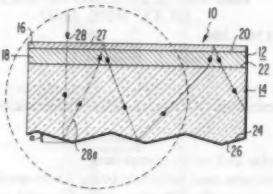
SOLAR CELL WITH GROOVED SURFACE

David Redfield, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 11, 1974, Ser. No. 450,000

Int. Cl.² H01L *31/02*

U.S. Cl. 136—89 **9 Claims**



1. A solar cell comprising a substrate transparent to solar light having a pair of opposed surfaces, an active layer of silicon semiconductor material on one surface of said substrate, said active layer having a surface of incidence, grooves in the other surface of said substrate, means for reflecting solar light at the surface of the grooves, said active layer being no greater than about 2.5 microns in thickness.

3,973,995

LEAK PROOF DRY CELL

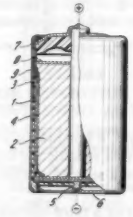
Toshiso Kamai, 30-10 Gohongi I-chome, Meguro, Tokyo, Japan

Filed Sept. 28, 1971, Ser. No. 184,370

Claims priority, application Japan, Sept. 29, 1970, 45-84625

Int. Cl.² H01M *2/04, 2/08*

U.S. Cl. 136—107 **2 Claims**



1. A dry cell including a protective synthetic plastic resin casing having a tubular portion, a zinc anode in the form of a sleeve within the said casing, a cake depolarizer, an electrolyte, a separator in the form of a sleeve positioned between the zinc sleeve and the cake, an outer rigid container for maintain-

ing the shape of the cell, said container having a base, an electrically conductive pin which makes electrical contact with the base of the said container, and a sealing mass which is sealed to said tubular portion and is positioned above said cake to form an air space between said cake and said sealing mass;

wherein the upper surface of the said zinc anode is below the upper extremity of the said cake, the separator extends above the upper surface of the said cake and is in direct water-tight connection with the tubular portion of the protective casing;

wherein the depolarizer comprises manganese dioxide and the electrolyte comprises ammonium chloride and zinc chloride, the zinc chloride being the main substance in the electrolyte; and

wherein the amount of cathode zinc is such that it has substantially totally reacted when the capacity of the cells falls below its useful voltage.

3,973,996

DIFFUSION WELDED SOLAR CELL ARRAY

Paul B. Kennedy, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 4, 1974, Ser. No. 448,103
Int. Cl.² H01L *35/02*
U.S. Cl. 136—206 **5 Claims**

1. A solar cell array comprising:

a. a substrate, said substrate being a non-metallic dielectric;

b. two solar cells diffusion welded to said substrate; and,

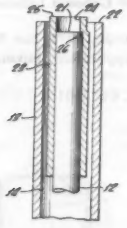
c. means for electrically interconnecting said two solar cells operably attached to each of said two solar cells.

3,973,997

THERMOCOUPLE WITH IMPROVED HOT JUNCTION

Ralph E. Solomon, Claremont, Calif., assignor to Jade Controls, Inc., Montclair, Calif.

Filed June 24, 1974, Ser. No. 482,009
Int. Cl.² H01L *35/04, 35/14*
U.S. Cl. 136—228 **20 Claims**



1. In a thermocouple, a hot junction comprising

a first member of a first electrically conductive metal alloy,

a second member of a second electrically conductive metal alloy,

and a third member of a third electrically conductive metal alloy,

said first, second and third members being fused together to form a unitary fused joint,

said first, second and third metal alloys being different from each other,

said second metal alloy having solution properties compatible with the solution properties of said first metal alloy and solution properties compatible with the solution properties of said third metal alloy.

3,973,998

RINSING SOLUTIONS FOR ACID CLEANED IRON AND STEEL SURFACES

Vijay Jang Datta, Louisville, and John David White, Prospect, both of Ky., assignors to Celanese Coatings & Specialties Company, Louisville, Ky.

Filed May 5, 1975, Ser. No. 574,214
Int. Cl.² C23C *9/02*
U.S. Cl. 148—6.14 R **8 Claims**

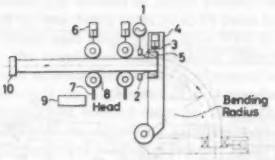
1. The process of acid cleaning of rusty iron and steel, the improvement which comprises rinsing the acid cleaned steel with an aqueous solution consisting essentially of a chelating agent capable of forming a complex with iron atoms and an ammonium or alkali metal silicate wherein the chelating agent is present in the amount of about 0.25 to about 3 percent by weight and the silicate is present in the amount of about 5 to about 15 percent by weight, said precents being based on the total weight of the aqueous solution.

3,973,999

METHOD FOR PRODUCING A HIGH TENSILE STRENGTH AND HIGH TOUGHNESS BEND PIPE

Masatoki Nakayama; Hajime Nakasugi, both of Kisarazu; Hiroshi Tamehiro, Kimitsu; Turugi Kimura, Kimitsu, and Masanobu Yamaguti, Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed July 11, 1975, Ser. No. 595,310
Claims priority, application Japan, July 11, 1974, 49-79623
Int. Cl.² C21D *9/08*
U.S. Cl. 148—12 R **4 Claims**



1. A method for producing a high tensile strength and high toughness bend pipe which comprises heating a rough steel pipe to an austenitization temperature prior to bending, cooling the steel pipe to a temperature ranging from 500°C to near the room temperature, locally heating the steel pipe at a temperature not lower than its A_3 temperature, bending the steel pipe, and cooling the steel pipe to the room temperature.

3,974,000

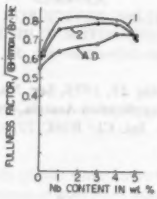
SEMI-HARD MAGNETIC MATERIALS

Zenzo Henmi; Tatsuji Sasaki, both of Kawasaki; Masanori Okada; Makoto Kassai, both of Yokohama, and Yuichi Suzuki, Kawasaki, all of Japan, assignors to Fujitsu Ltd., Japan

Continuation-in-part of Ser. No. 286,885, Sept. 7, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,311
Claims priority, application Japan, Sept. 13, 1971, 46-71422; Feb. 29, 1972, 47-20716
Int. Cl.² C04B *35/00*
U.S. Cl. 148—31.55 **3 Claims**

1. A worked and heat-treated semi-hard magnetic alloy consisting essentially of 15 to 30% by weight of nickel, 35 to 52% by weight of iron, 1 to 5% by weight of niobium and the balance cobalt, and having a coercive force of 10 to 50 Oe, a

magnetic flux density at a magnetic field of 100 Oe, of 10 to 17.5 kilo gauss, a squareness ratio of not lower than approxi-



mately 0.70 and also having a fullness factor not lower than approximately 0.70.

3,974,001

PARAMAGNETIC ALLOY

Samuel Steinemann, Waldenburg, and Martin Peter, Petit-Lancy, both of Switzerland, assignors to Institut Dr. Ing. Reinhard Straumann, A.G., Waldenburg, Switzerland

Continuation of Ser. No. 405,571, Oct. 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 140,288, May 4, 1971, abandoned, which is a continuation-in-part of Ser. No. 796,298, Jan. 23, 1969, abandoned, which is a continuation of Ser. No. 631,685, April 18, 1967, abandoned. This application Oct. 9, 1974, Ser. No. 513,389

Claims priority, application Switzerland, Apr. 22, 1966, 5877/66

The portion of the term of this patent subsequent to Dec. 15, 1987, has been disclaimed.

Int. Cl.² C22C *19/00*

U.S. Cl. 148—32.5 **5 Claims**

1. A vibratory or spring component formed from a worked and heat treated alloy wherein the alloy constituents consist essentially of an element selected from the group consisting of scandium, yttrium, lanthanum, niobium, tantalum, vanadium, palladium and platinum alloyed with a minor constituent selected from the group consisting of titanium, zirconium, aluminum, molybdenum, cobalt, iron, rhodium, iridium, silver and copper and wherein at least one of the elements of said alloy has an electron concentration lying outside of the following ranges:

2.7 – 3.3

4.3 – 5.2

6.4 – 7.3

9.6 – 10.2

said alloy being paramagnetic, and possessing:

a. temperature coefficient of the moduli of elasticity between -1×10^{-4} per °C and $+10^{-4}$ per °C;

a magnetic atomic susceptibility χ of greater than 10^{-4} emu/g-atom at room temperature, corresponding to a specific heat of greater than 10^{-3}

$$\frac{\text{cal}}{\text{g-atom } (^{\circ}K)^2}$$

at low temperature and;

a non-positive temperature coefficient $(d\overline{N}/dT)(E_F)$ of the effective density of states exhibited in a non-positive temperature coefficient dx/dT of the magnetic susceptibility.

3,974,002

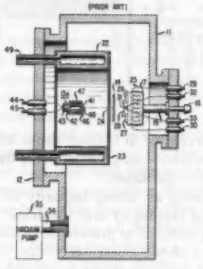
MBE GROWTH: GETTERING CONTAMINANTS AND FABRICATING HETEROSTRUCTURE JUNCTION LASERS

Horace Craig Casey, Jr., Summit; Alfred Yi Cho, New Providence, and Morton B. Panish, Springfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 10, 1974, Ser. No. 477,975

Int. Cl.² H01L *7/36*

U.S. Cl. 148—175 **10 Claims**



7. A method of fabricating an epitaxial semiconductor layer of a Group III(a)–V(a) compound material on a substrate surface comprising the steps of:

a. placing the substrate in an evacuable metal chamber;

b. reducing the pressure of said chamber to a subatmospheric pressure;

c. preheating said substrate to a temperature suitable for epitaxial growth thereon;

d. directing at least one molecular beam comprising the constituents of said layer upon said surface of said substrate for a time period effective to epitaxially grow said layer to a desired thickness; characterized by

e. during step (d) directing at least one molecular beam at an interior surface of said chamber to continuously form thereon fresh layers effective to getter O_2, CO, H_2O and hydrocarbon contaminants within said chamber.

3,974,003

CHEMICAL VAPOR DEPOSITION OF DIELECTRIC FILMS CONTAINING Al, N, AND Si

Stanley Zirinsky, Dobbs Ferry; Eugene A. Irene, Wappingers Falls, and Victor J. Silvestri, Mount Kisco, all of N.Y., assignors to IBM, Armonk, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,420

Int. Cl.² H01L *21/318, 29/78*

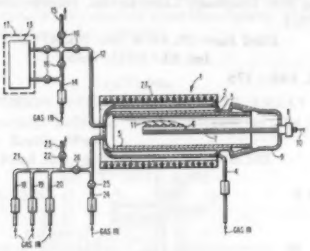
U.S. Cl. 148—187 **38 Claims**

19. A method for fabricating a semiconductor device which comprises:

A. providing a semiconductor substrate of a first conductive type containing an active impurity of a first type in a reaction zone; a carrier gas, and a reactive gaseous mixture of:

1. a nitrogen compound capable of providing reactive gaseous nitrogen at the conditions in said reaction zone;
2. aluminum compound capable of providing reactive gaseous aluminum at the conditions in said reaction zone; and
3. a silicon compound capable of providing reactive gaseous silicon at the conditions in said reaction zone;

B. heating the substrate in said reaction zone to a temperature in the range of about 500° to about 1300° C to thereby cause formation on the substrate of a layer containing Al, N, and Si wherein the atomic percent of N in the layer is from about 50 to about 57%, the atomic percent of Al is from about 30 to about 5%, and the



atomic percent of Si is from about 20 to about 40%, the atomic percents being based upon the total atoms of N, Al, and Si in the layer;

C. incorporating an active impurity of a second type into preselected regions of said substrate;

D. removing material at preselected locations of the layer to provide for ohmic electrical contact between preselected regions of the underlying semiconductor substrate and subsequently apply electrical contacts; and

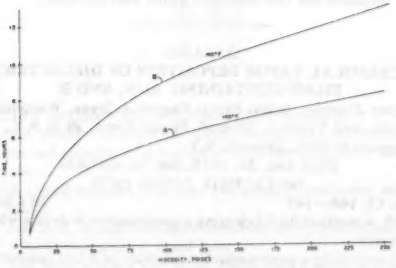
E. then depositing a plurality of electrical contacts at preselected locations wherein a predetermined number of the contacts are in ohmic electrical contact with the preselected regions of the underlying semiconductor substrate so as to provide the semiconductor device.

3,974,004

EXTENSION OF POT LIFE OF HTPB COMPOSITE PROPELLANTS BY PHOSPHINE OXIDES

Marjorie T. Cucksee, Huntsville, and Henry C. Allen, Decatur, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 4, 1974, Ser. No. 439,151
Int. Cl.² C06B *45/34, 45/10, 45/08*
U.S. Cl. 149—7 **10 Claims**



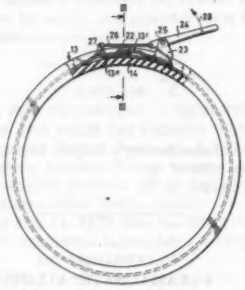
1. An isocyanate curable composite propellant composition having extended pot life, said composition comprised of hydroxy terminated polybutadiene binder, an isocyanate curing agent, inorganic oxidizer consisting of ammonium perchlorate of less than 20 micron particle size, and an additive that is effective in extending pot life of said composition in an amount from about 0.1 to about 0.3 weight percent, said additive selected from the trialkyl phosphine oxides consisting of trioctylphosphine oxide and tributylphosphine oxide.

3,974,005

INFLATION SEALING DEVICE FOR TUBELESS TIRES FOR MOTOR VEHICLES

Josef Graml, Albert-Schweitzer-Str. 50, 8398 Pocking, Germany

Filed May 27, 1975, Ser. No. 580,944
Claims priority, application Austria, Oct. 3, 1974, 7976/74
Int. Cl.² B60C *25/00*
U.S. Cl. 157—1.1 **5 Claims**



1. An apparatus for sealing a tubeless tire on a rim while the tire is being inflated, said rim having an annular lip, said apparatus comprising a ring shaped member split transversely at one point to provide overlapping ends, an annular flexible member loosely disposed within said ring shaped member, said ring shaped member and flexible member being adapted to be disposed about the rim with the flexible member disposed against the lip of the rim and against a sidewall of the tire, and means for clamping said ends together and press the flexible member into fluid tight engagement with the said lip and said sidewall.

3,974,006

METHOD OF OBTAINING HIGH TEMPERATURE RESISTANT ASSEMBLIES COMPRISING ISOLATED SILICON ISLANDS BONDED TO A SUBSTRATE

Valentin Rodriguez, 6, Square Chardin - Parly 2, 78140 Le Chesnay, Spain

Filed Mar. 21, 1975, Ser. No. 560,813
Int. Cl.² H01L *7/50*
U.S. Cl. 156—3 **13 Claims**

1. A method of obtaining high temperature resistant assemblies comprising isolated silicon islands bonded to a substrate, comprising the steps of:

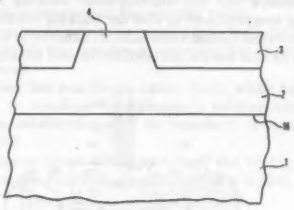
preparing an initial wafer comprised of a silicon member having unisolated silicon islands nested within a layer of silicon oxide having an interface with the silicon material at the base level of said islands and having an exposed surface level with the exposed faces of the islands,

oxidizing the complete surface of the exposed silicon oxide layer and the exposed surfaces of the islands,

forming a dielectric layer over the said completely oxidized surface, said dielectric layer having at least its exposed surface comprised of silicon oxide,

separately preparing a substrate having at least an exposed surface comprised of silicon oxide,

uniting the said two surfaces of silicon oxide with a phosphosilicate glass at a fusion temperature producing diffusion of the glass into the oxide,



removing the silicon of said wafer up to the level of the said interface, said removal operation comprising an electrolitic etching step at least as the final step thereof.

3,974,007

METHOD AND APPARATUS FOR THE PRODUCTION OF FILTER ROD SECTIONS OR THE LIKE

Heinz Greve, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

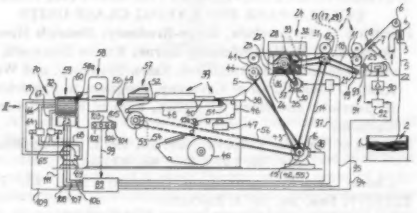
Division of Ser. No. 360,598, May 15, 1973, Pat. No. 3,865,016, which is a division of Ser. No. 131,167, April 5, 1971, Pat. No. 3,741,846. This application Dec. 5, 1974, Ser. No. 530,040

Claims priority, application Germany, Apr. 11, 1970, 2017360

The portion of the term of this patent subsequent to Feb. 11, 1990, has been disclaimed.

Int. Cl.² A24C *5/50*

U.S. Cl. 156—64 **12 Claims**



1. A method of collecting samples of filter rod elements or analogous rod-shaped articles which are composed of at least one main component and at least one secondary component, particularly a secondary component which influences the condition of the main component, comprising the steps of converting first and second effective quantities of main and secondary components into a first rod; subdividing the first rod into a succession of first rod-shaped articles each having a predetermined length; conveying the first rod-shaped articles along a predetermined path; reducing the quantity of second component in said converting step to zero in response to a first signal so that said converting and subdividing steps thereupon respectively result in the making of a second rod and a succession of second rod-shaped articles which are devoid of said secondary component; removing second rod-shaped articles from a predetermined portion of said path in response to a second signal which is produced with a delay following said first signal; and increasing the quantity of said secondary component in said converting step to said second effective quantity in response to a third signal which is produced with a delay following said second signal.

3,974,008

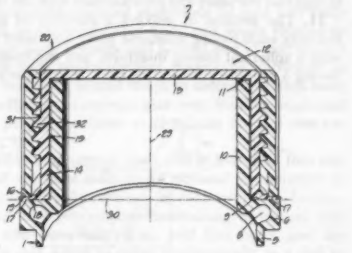
METHOD OF MAKING A FRANGIBLE CLOSURE SYSTEM FOR MEDICAL LIQUID CONTAINER

Pradip V. Choksi, North Hollywood, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Division of Ser. No. 338,685, March 7, 1975, Pat. No. 3,923,182. This application Sept. 15, 1975, Ser. No. 613,244

Int. Cl.² B65B *7/00*

U.S. Cl. 156—69 **7 Claims**



1. A method of forming a sterile medical liquid container comprising the steps of: forming a container with a dispensing neck having a longitudinal axis and a flange with an upper surface that is generally perpendicular to the neck's longitudinal axis; forming a cap with a longitudinal axis, said cap having external threads thereon and an external lateral annular brim lying in a plane generally perpendicular to the cap's longitudinal axis; fitting said cap over said dispensing neck until the frangible brim contacts the container flange; applying an annular heating member to the frangible brim to hermetically fuse at least an annular portion of the frangible brim to the flange; removing said heating member.

6. A method of forming a sterile medical liquid container comprising the steps of:

a. blow molding a thermoplastic container with a dispensing neck having a longitudinal axis;
b. injection molding a thermoplastic cap with a longitudinal axis, external threads, and a frangible section;
c. forming an internally threaded jacking ring;
d. fitting the cap over the container neck without a threaded engagement between the cap and neck;
e. fusing the cap to the bottle; and
f. threading the jacking ring unto the external threads of the cap to a depth sufficient to retain the jacking ring on the cap, but stopping short of fracturing the cap's frangible section.

3,974,009

METHOD FOR MAKING BALL AND SOCKET TYPE BEARINGS IN MULTIPLE

Neil W. Butzow, Greendale, and Bernard Harris, Milwaukee, both of Wis., assignors to Rex Chainbelt Inc., Milwaukee, Wis.

Filed May 21, 1969, Ser. No. 826,565

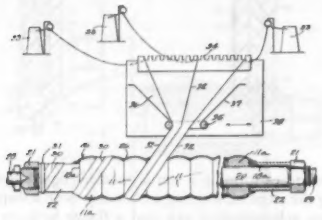
Int. Cl.² B29C *27/22*

U.S. Cl. 156—84 **14 Claims**

1. The method of constructing ball and socket assemblies in multiple, each ball having a spherical bearing surface between circular ends and central bore therethrough, each socket comprising a hardened material with helically wound reinforcing filaments and a low-friction material adjoining the bearing surface of the ball; which method comprises the steps of assembling and securing said balls in endwise relation on a rigid arbor and between cores, providing said material in the form of a sleeve and tightly applying the same over the assembled balls with sufficient gathering at the joints between balls, simultaneously applying the liquid material to the outside of the sleeve and rotating the arbor and winding the filaments

under tension over the sleeve to compress the latter, said filaments being helically wound in a continuous operation by reversing the direction of the helix while winding around the cores and at such angle that the sleeve gatherings are tightened over the balls with a minimum amount of bridging of the sleeve over the joints between balls, maintaining the entire assembly at such temperature which causes the liquid material to harden with rotation as required and to form a rigid tube which includes said filaments and sleeve, and as a final step cutting and finishing the sections of said tube around said balls to separate the same and provide each with the desired socket.

11. The method of making a plurality of plain spherical bearings each having rotatable inner and outer ring members with a spherical sliding interface, and the innerring member having a cylindrical mounting bore, which comprises selecting



an elongated cylindrical mandrel of size to fit and concentrically support the inner-ring bore assembling a plurality of such inner-ring members to the mandrel in longitudinally aligned array, whereby the external contour of the mandrel is characterized by plural spaced spherical surfaces, circumferentially enveloping said contour with a flexible low-friction fabric, helically enwrapping the fabric with strands of a reinforcing material to which hardenable-liquid bonding material is bondable, said wrapped strands and fabric being impregnated with said material, whereby fibers of the fabric and of the reinforcing material are embedded in hardenable material curing the hardenable material to ultimate hardness, finishing the hardened mass to desired external contour, and severing separate plain-spherical bearings by radial-plane cutting of the hardened mass at substantially bearing-unit intervals.

3,974,010

METHOD OF STITCHING AND BONDING EMBROIDERIES ONTO THERMOPLASTIC BACKING SHEETS

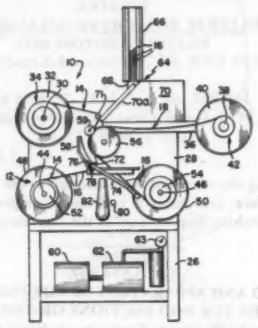
Thaddeus Hall Cox, Jr., Freeland, Md., assignor to Artistic Identification Systems, Inc., Pompton Lakes, N.J.

Filed May 7, 1975, Ser. No. 575,332

Int. Cl.[2] B32B *7/08;* **B65H** *81/00;* **D05C** *17/00*

U.S. Cl. 156—93 **15 Claims**

1. A method of preparing articles of aetzed embroidery having an adhesive coating on first surfaces thereof and mounting said articles by said adhesive coatings on a carrier strip for storage thereon and ready removal therefrom, comprising the steps of forming embroideries on a thermoplastic backing material to form composites, juxtaposing a carrier strip having a layer of thermoplastic adhesive on a first side thereof and a transfer strip having a first side thereof to which said thermoplastic adhesive and said thermoplastic backing material will more readily adhere than to said first side of said carrier strip with said first sides facing each other, disposing said composites between said juxtaposed strips with the first side of said transfer strip to which said adhesive and said backing material are to be applied facing said layer of thermoplastic adhesive and said embroideries, said adhesive-receiving surfaces of said embroideries being ones to which said thermoplastic adhesive and said thermoplastic backing material will more firmly adhere than to said first side of said carrier strip, pressing the strips together with said composites therebetween to form a temporary laminate of said strips and said composites and simultaneously applying heat to said thermoplastic adhesive and said thermoplastic backing material while said pressure is being applied to bring the thermoplastic adhesive and the thermoplastic backing material to their fusing temperatures so that the backing material and the adhesive covered by said embroideries adheres to said embroideries and so that the excess portions of said backing material



and said adhesive not covered by said embroideries fuse and adhere to the first side of said transfer strip, and then separating the strips in a manner such that the aetzed embroideries have a thermoplastic backing material adhered thereto and said aetzed embroideries have adhesive coatings and are lightly adhered by their adhesive coatings to the first side of said carrier strip for storage thereon and ready separation therefrom, and said excess portions of said backing material and said adhesive remain on said transfer strip.

3,974,011

METHOD FOR CEMENTING IN THE MANUFACTURE OF DOUBLE-PANE INSULATING GLASS UNITS

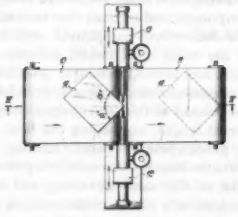
Friedrich G. K. Jarchow, Essen-Bredeney; Dietrich Haensel, Bochum; Willi Hempelmann, Herne; Ranier Sturmath, Bochum-Linden; Hans Ringleben, Essen-Bredeney, and Walter Knabel, Munich, all of Germany, assignors to Friedrich G. K. Jarchow and Hans Ringleben, both of Essen-Bredeney, Germany

Division of Ser. No. 417,494, Nov. 20, 1973. This application Apr. 30, 1975, Ser. No. 573,601

Claims priority, application Germany, Nov. 23, 1972, 2257377; Feb. 24, 1973, 2309295

Int. Cl.[2] B32B *31/30;* **C03C** *27/08*

U.S. Cl. 156—107 **8 Claims**



1. In the manufacture of double-pane insulating glass units comprising first and second panes separated by a frame-shaped spacer and formed into a pane package by the injection of a cement into an interspace along the periphery of the pane package, which interspace is limited by the outside of the spacer and edges of the two panes projecting beyond the

spacer, the improved method of injecting the cement comprising the steps of:

A. providing cement from orifices in two injecting nozzles,

B. initially placing the two nozzles in a common starting region on said periphery to begin injecting the cement into the interspace at the starting point,

C. continuing to inject the cement into the interspace while moving the two nozzles in opposite directions along the periphery

D. rotating the nozzles to cause them, while injecting cement, to continue to maintain a substantially constant angular relationship with the periphery of the pane package, and

E. ceasing to inject the cement into the interspace as the two nozzles reach a common terminal region.

3,974,012

APPARATUS AND METHOD FOR FORMING TAPERED TUBULAR SHAFTS

Harold P. Hogarth, 8605 7th St., Downey, Calif. 90241

Filed Dec. 5, 1973, Ser. No. 421,786

Int. Cl.[2] B65H *81/00*; B32B *31/00*

U.S. Cl. 156—161 **6 Claims**

1. A method of forming an elongate tubular tapered shaft that has a interior sidewall surface that is concentrically centered relative to an exterior sidewall surface of said shaft from a plurality of wraps of a sheet thermo-setting resin of tacky consistency that contracts in volume upon polymerizing that has a plurality of laterally spaced, parallel pretensioned fibers enveloped therein that are formed from a material that has a greater tensile strength than said resin when the latter is polymerized and said resin when polymerized having a greater degree of elasticity than said material forming said fibers, which method includes the steps of:

a. winding said wraps transversely about a first elongate tapered heat conducting body having first and second end portions, said wraps overlying one another and being intermediately disposed between said first and second end portions, with the tapered external surface of said body between said first and second end portions being that of said interior sidewall surface, said second end of said first body being of smaller transverse cross section than said first end of said first body, said wraps being sufficient in number to provide at least an interior wrap and an exterior wrap when wound on said first body and the fibers in at least one of said wraps being parallel to the longitudinal axis of said shaft;

b. sliding said first body and wraps into the confines of a second heat conducting body that defines an elongate interior surface that has a tapered configuration that is the same as said external sidewall surface, said second body having first and second ends, with said second end of smaller transverse cross section than said first end of said second body, and the longitudinal spacing between said first and second ends being greater than the length of said wraps on said first body to provide a longitudinal annulus shaped space between said second end of said first body and said second end of said second body adjacent said second end of the latter;

c. maintaining said first body in substantially true concentric relationship with said second body;

d. applying a longitudinally directed spring generated force of predetermined constant magnitude to said first body that tends to move said first body and wraps relative to said second body towards said second end of said second body with said predetermined magnitude sufficient to compact said resin in said wraps to define a unified mass but not sufficient to squeeze said resin from between said fibers to permit the latter to physically contact one another;

e. heating all of said second body and at least said first end portion of said first body to an elevated temperature at which said resin polymerizes with said resin in said outermost wrap as it polymerizes contracting in volume and allowing said outermost wrap, said first body, and the balance of said wraps to move longitudinally as a unit in said second body towards said second end thereof until the external surface of the polymerized outermost wrap is disposed at a section of said interior surface of said second body that is of substantially the same size and shape as the exterior surface of said first wrap that has said resin therein polymerized;

f. continuing to heat said first end portion of said first body for said heat to flow longitudinally therethrough to heat said innermost wrap to a temperature at which said resin therein polymerizes and contracts in volume, with said force as said resin in said innermost wrap contracts moving said first body and said innermost wrap towards said second end of said second body and relative to said second body and outermost wrap to pretension at least a portion of said fibers in said innermost and outermost wraps and in any of said wraps intermediately disposed between said innermost and outermost wraps;

g. continuing to heat said second body and at least said first end portion of said first body for heat to flow therefrom through said innermost and outermost wraps to polymerize the resin in intermediately positioned wraps therebetween;

h. terminating the application of said force to said first body after said resin in all of said wraps has been polymerized; and

i. separating said first and second bodies from said wraps that have had said resin therein polymerized and which now constitute said tubular tapered shaft in which at least a portion of said fibers therein are pre-tensioned and immediately take the major portion of the load when said shaft is transversely flexed.

3,974,013

METHOD FOR INSULATING TUBING

Erling Roos, Upplands Vasby, Sweden, assignor to Granges Essen Aktiebolag, Vasteras, Sweden

Filed Feb. 21, 1975, Ser. No. 551,847

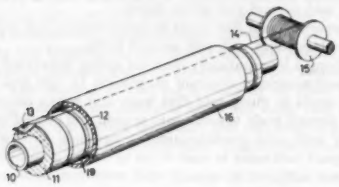
Claims priority, application Sweden, Feb. 25, 1974, 74.024860

Int. Cl.[2] B65H *81/02*

U.S. Cl. 156—165 **3 Claims**

1. A method of insulating tubing, comprising the steps of providing a tubing with a jacket of insulating material in web form; fixing the jacket with regard to its diametrical dimensions by means of a fixing casing, said fixing step is accomplished by means of a cord or strip-like material, by winding the latter around the jacket; further comprising the steps of compressing the jacket onto the tube; and cutting the cord or

strip-like material externally of the tube, subsequent to said enclosing step without cutting said tubing or said outer casing; enclosing the jacketed and enclosed tubing in a continuous tubular outer casing, by applying relative movement between



the tubing and the outer casing in the longitudinal direction thereof; and subsequently cutting the fixing casing longitudinally thereof, thereby breaking the fixed state of the jacket, thus conforming the latter in shape to the inner wall of the outer casing.

3,974,014

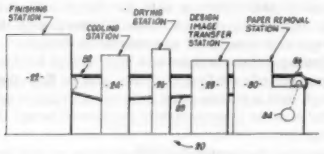
METHOD FOR TRANSFERRING DESIGN IMAGE TO WAX ARTICLES

Merlin M. Meisner; Raymond M. Matulis, and James R. Mackey, all of Overland Park, Kans., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.

Filed July 10, 1974, Ser. No. 486,820

Int. Cl.[2] B32B *01/08*; **B41M** *01/10*, *03/12*; **C11C** *05/00*

U.S. Cl. 156—240 **14 Claims**



1. A method of transferring a design image to a wax article comprising the steps of:

providing a series of individual transfer sheets each having an external coating of heat meltable wax on opposite faces thereof;

gravure imprinting a shaded or half tone design image in ink on one waxed surface of each of said sheets, said ink being capable of adhering to said waxed surface;

wrapping an imprinted sheet about a respective wax article in closely conforming relationship thereto with said design image facing said article, each of said sheets having a dimension in the direction of wrap thereof around a corresponding article at least equal to the circumscribing dimension of the article in such direction, and said image being of dimensions to substantially abut end to end when a sheet with said image thereon is wrapped about a respective article;

applying sufficient heat and pressure to the sheet while wrapped around the article to melt the wax surface carrying said image to an extent to effect transfer of wax supporting said design image to the wax article;

lowering the temperature of the design supporting wax layer transferred to the article to a level to cause such wax to firmly adhere to the article in covering relationship to said design with the latter firmly affixed to the article; and

stripping said sheet from said wax article.

3,974,015

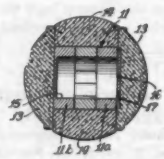
METHOD OF FORMING COMPRESSION MOLDED ARTICLE

Foster W. Berry, Muskegon, Mich., assignor to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 212,026, Dec. 27, 1971, abandoned, which is a continuation-in-part of Ser. No. 34,924, April 24, 1970, Pat. No. 3,704,016. This application Feb. 15, 1974, Ser. No. 442,796

Int. Cl.[2] A63B *71/00*; **B29C** *3/00*; **B29G** *1/00*

U.S. Cl. 156—245 **4 Claims**



1. The method of forming a bowling pin body comprising the steps of:

a. molding uniformly dense material of wood fibers and binder resin to define a plurality of cheek-forming elements, the molding comprising the steps of:

1. forming a cheek preform having a variable thickness; and

2. compressing different portions of the preform a preselected amount to provide elements having a preselected density distribution, the density being greatest at the pin's ball line;

b. providing a bowling pin core;

c. securing said elements in a series about the bowling pin core to define a blank; and

d. finishing said blank to a bowling pin body configuration.

3,974,016

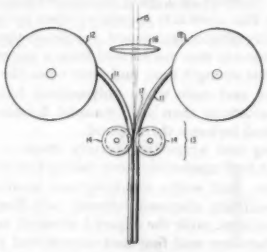
BONDING OF THERMOPLASTIC COATED CYLINDERS

Vladimir Edmund Bondybey, Fanwood, and Arthur Haines Fitch, Berkeley Heights, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 4, 1974, Ser. No. 520,610

Int. Cl.[2] B32B *31/20*, *31/04*

U.S. Cl. 156—272 **7 Claims**



1. Method of bonding at least two flexible cylindrical bodies to one another comprising feeding the bodies, at least one of which bodies comprises a cylindrical outer region consisting of a thermoplastic polymeric composition and a cylindrical inner region including a nonpolymeric material, individually from body sources and guiding the bodies into contact with one another at one contact point for each pair of contacting surfaces, which contact point remains approximately stationary as the bodies are being transported longitudinally past the

contact point CHARACTERIZED IN THAT a laser beam of selected wavelength is directed at each contact point and directed approximately parallel to the axis of the bodies, which laser beam provides localized heating in the region of the contact point sufficient to produce bonding by plastic flow of the thermoplastic polymer.

3,974,017

METHOD OF ASSEMBLING A FLAT PLATE TYPE ROTARY TRANSFORMER

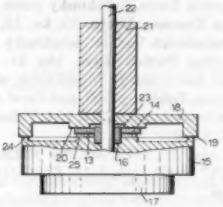
Shizuhiko Tanigawa, Moriguchi; Yoshinori Yamazoe, Abeno, and Chihiro Nakamura, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed July 2, 1974, Ser. No. 485,134

Claims priority, application Japan, July 12, 1973, 48-79160; July 16, 1973, 48-85346[U]

Int. Cl.² C09J *5/00*

U.S. Cl. 156—309 **3 Claims**



1. A method of mounting a magnetic core for a flat plate type rotary transformer on a bonding surface of a supporting member of the transformer having a datum surface thereon, which comprises the steps of:

a. placing the magnetic core on the bonding surface of the supporting member with an adhesive between the magnetic core and the bonding surface with the surface of the magnet core on the opposite side from that in contact with the adhesive being a non-bonding surface;

b. placing over the magnetic core and the supporting member a position controlling plate having a position controlling surface and a position setting surface spaced from the position controlling surface at a predetermined distance in the direction of the gap dimension of the transformer with the position setting surface in contact with the non-bonding surface of the magnetic core and the position controlling surface opposed to the datum surface on the supporting member; and

c. urging the position controlling plate toward the supporting member until the position controlling surface contacts the datum surface of the supporting member, and maintaining the position controlling plate with the position controlling surface in contact with the datum surface while the adhesive hardens.

3,974,018

DEVICE FOR MAKING PNEUMATIC TIRES

Iwao Arimura, Kodaire, and Yasuo Suzuki, Tokyo, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

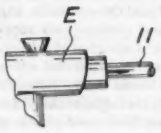
Continuation-in-part of Ser. No. 272,887, July 18, 1972, abandoned. This application Dec. 12, 1974, Ser. No. 532,308

Claims priority, application Japan, July 30, 1971, 46-57349

Int. Cl.² B29H *5/06*

U.S. Cl. 156—394 **6 Claims**

1. A mold assembly for making a pneumatic tire having a high lug or deep tread pattern, comprising an outer mold defining a tire-shaping cavity therein and having an upper half and a lower half separably joined along a mid-circumferential plane of the tire-shaping cavity, tread pattern recesses arranged in a circumferential direction at positions corresponding to the tread portion of said tire, said outer mold having an inflatable bladder secured to one of the mold halves so as to be positioned at a central portion of the tire-shaping cavity formed in said outer mold, and annular recesses at the joined portion of said mold halves, said annular recesses being spaced from said tire-shaping cavity a determined distance for arranging rubber rods to be formed into lugs, said annular recesses being wedge-shaped in cross-section and having inner surfaces substantially at right angles to said mid-circumferential plane; and an annular core replaceably positioned in the inside of said tire-shaping cavity, said annular core having a mold surface of the same shape as the inner surface of said tire-shaping cavity in the region of said tread pattern recesses and being adapted to fit substantially in close contact with said inner surface of said tire-shaping cavity, said mold surface



having a width in the axial direction of the tire which is substantially the same as the width of said tread portion of the tire, said mold surface being formed on a radially outer peripheral surface of the core and adapted to close the tread pattern recesses in said cavity, said mold surface of the core being plated with a chromium layer of 1/100 mm to 4/100 mm thickness and being smoother than the opposed inner surface of the tire-shaping cavity, said core having an annular flange integrally extending radially outwardly from a central outer surface so as to be positioned between said mold halves at said joined portion, said annular flange being provided with wedge-shaped projections extending from both sides of the flange so as to snugly fit within said wedge-shaped annular recesses, and said mold halves having a number of vent holes communicating with said tire-shaping cavity in the area opposed to said mold surface of the core.

3,974,019

APPARATUS FOR MANUFACTURING PLASTIC PIPES

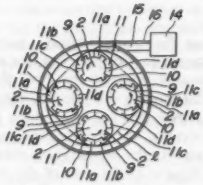
Kenichi Tanaka, Musashino, Japan, assignor to Kakuichi Mfg. Co., Ltd., Ueda, Japan

Continuation of Ser. No. 265,448, June 23, 1972, abandoned. This application May 29, 1974, Ser. No. 474,344

Claims priority, application Japan, Feb. 29, 1972, 47-20198

Int. Cl.² B29D *23/04, 23/12*

U.S. Cl. 156—429 **2 Claims**



1. An apparatus for continuously manufacturing a reinforced plastic pipe which is flexible and has a substantially I-shaped reinforcing spiral core embedded therein and partly exposed out of the pipe wall, comprising a supporting frame, at least three positively driven shafts arranged parallel to each other and rotatably journaled at one end by said supporting frame, the centers of said positively driven shafts being arranged at vertexes of a regular polygon, respectively; a driving

motor connected through gears for driving all of said positively driven shafts at the same speed in the same direction; at least three segmental sleeves slidably fitted around each of said driven shafts and each having a pin slidably engaged with a rhombus-shaped groove cut in the inner wall of a bore in said supporting frame; with the arrangement of said shafts being such that the exterior surface of said sleeve portions are internally tangential to the path of the interior surface of a pipe to be manufactured thereon, and means for axially moving each segmental sleeve portion on each shaft such that each sleeve portion is moved axially away from said supporting frame when that sleeve portion is internally tangential to said path, and is moved axially toward said frame when it is not internally tangential to said path and a feeding device for supplying a continuous reinforced plastic strip, which strip has a substantially I-shaped reinforcing core embedded therein and partly exposed out of said plastic strip, to those portion of said segmental sleeves which are near said supporting frame, whereby rotation of said driven shafts, axial movement of said segmental sleeves and continuously supplying of said plastic strip produces a helical advance of said plastic strip away from the supporting frame and thermal adherence of the lateral edges of successive turns of the advancing strip in abutting relation substantially throughout the overall periphery thereof to form an elongated reinforced plastic pipe.

3,974,020

CARPET MAKING MACHINE

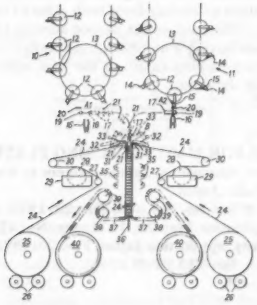
Robert Logan, Glasgow, and Adam McGregor, Stewarton, both of Scotland, assignors to British Carpets Ltd., Glasgow, Scotland

Filed July 5, 1974, Ser. No. 485,786

Claims priority, application United Kingdom, Aug. 8, 1973, 37682/73

Int. Cl.² D04H 11/00

U.S. Cl. 156—435 **8 Claims**



1. A machine for manufacturing carpeting comprising means for presenting ends of yarn in a row at a gripper station, means for releasably gripping the row of yarn ends at said station, means for moving the gripping means and presenting means one way from the other to draw the ends out to a predetermined extent, engaging means for supportingly engaging the drawn lengths of the yarn, means for cutting the drawn lengths of yarn at the side of the engaging means remote from the gripping means thereby to form cut lengths of yarn having first and second ends, means for moving the engaging means between the gripper station and an assembly station where said cut lengths of yarn are substantially straight and said first ends of said cut lengths of yarn supported by the engaging means are implanted in an adhesive surface of a web of backing material, said moving means being adapted to complete the moving of the cut lengths of yarn into engagement with said adhesive surface by moving the substantially straight cut lengths transversely of themselves and substantially parallel to said adhesive surface at the assembly station, and wiper means at the assembly station for holding said first ends of the lengths of yarn in engagement with said adhesive surface.

3,974,021

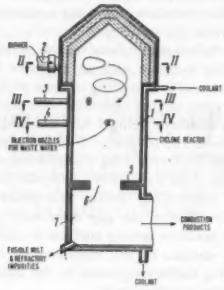
PROCESS AND CYCLONE REACTOR FOR FIRE DECONTAMINATION OF INDUSTRIAL WASTE WATER CONTAINING ORGANIC AND REFRACTORY MINERAL IMPURITIES

Mikhail Naumovich Bernadiner, Ozernaya ulitsa 36, kv. 20; Anatoly Alexandrovich Dobrovolsky, Novo-Kuzminskaya ulitsa, 10, kv. 91; Boris Semenovich Esilevich, ulitsa 9 Rota, 14, kv. 10; Georgy Nesanelovich Rubinshtein, ulitsa Shukhova, 17, kv. 10; Viktor Georgievich Gubarev, ulitsa Novaya Bodraya, 5, korpus 2, kv. 341; Emanuil Ivanovich Shipov, M. Afanasievsky pereulok, 6, kv. 4, all of Moscow; Petr Mikhailovich Sharov, Schekinsky raion, poselok Pervomaisky, ulitsa Komsomolskaya, 33, kv. 14, Tulskaya oblast; Boris Isaevich Lurie, Schekinsky raion, poselok Pervomaisky, ulitsa Komsomolskaya, 33, kv. 22, Tulskaya oblast; Arkady Dmitrievich Vodnev, Schekinsky raion, poselok Pervomaisky, ulitsa Oktyabrskaya, 16a, kv. 10, Tulskaya oblast; Alexandr Bentsionovich Moshkovich, ulitsa Yasnaya, 6, kv. 49, Schekino Tulskoi oblasti, and Pavel Alexandrovich Lupanov, ulitsa Sovetskaya, 32, kv. 154, Vidnoe Moskovskoi oblasti, all of U.S.S.R.

Filed Aug. 27, 1974, Ser. No. 500,854

Int. Cl.² B01D 1/16, 1/22; F23C 5/18

U.S. Cl. 159—4 A **7 Claims**

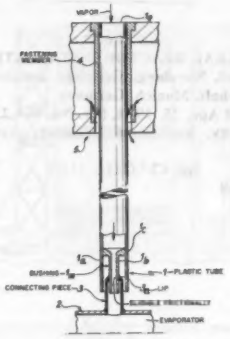


1. A process for fire decontamination of industrial waste water containing organic and fusible mineral impurities and other waste water containing refractory mineral impurities comprising, introducing into a combustion chamber of a reactor a fuel air mixture combusted as a whirling mixture of combustion gases, introducing into the combustion gases below the level of the combustion chamber at least one spray of waste water containing organic and fusible impurities to combust the organic impurities and evaporate the water therefrom and develop a zone in said reactor in which a film flow of the fused fusible impurities flows under the effect of gravity downwardly on the interior wall surfaces of the reactor, introducing tangentially to said interior surfaces and into said zone at least one spray of waste water having refractory mineral impurities for evaporating the water and entraining the refractory impurities in said film flow, removing the combustion products of the organic material and removing the film flow of fused fusible mineral impurities along with the refractory impurities entrained therein.

3,974,022
DEVICE FOR MOUNTING PLASTIC NON-RIGID TUBES IN EVAPORATORS

Fernand Lauro, Fontaine, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Aug. 27, 1974, Ser. No. 501,092
Claims priority, application France, Sept. 7, 1973, 73.32372
Int. Cl.² B01D *1/22, 1/00;* **F28F** *7/00, 9/04*
U.S. Cl. 159—13 B **5 Claims**

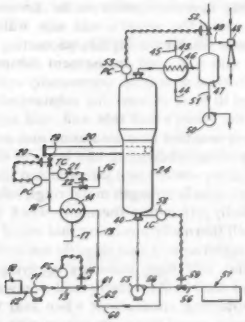


1. A device for mounting plastic tubes within the fixed structure of a distillation plant with evaporators of the vertical or horizontal tube-nest type, wherein each nest consists of non-rigid tubes which are internally traversed by vapor and each secured at one end to said structure by means of a standard fastening member, the other end of each tube through which the vapor is discharged being secured to said structure by means of a sliding expansion joint having a through passageway, said joint being secured to and within the tube and said passageway being of small cross-sectional area compared with that of the tube, the pressure of the vapor in the tube causing a tube tensioning piston effect on the expansion joint.

3,974,023
METHOD FOR CONCENTRATION OF FOAMING LIQUIDS

Brian Bowers, Sarnia, Canada, assignor to Polymer Corporation Limited, Sarnia, Canada

Filed May 11, 1972, Ser. No. 252,410
Claims priority, application Canada, June 30, 1971, 117045
Int. Cl.² B01D *1/22*
U.S. Cl. 159—49 **1 Claim**



1. An improved process for concentrating a heat-sensitive, liquid, foamable, aqueous dispersion of a non-volatile organic material which comprises

A. adiabatically vaporizing a heated stream of latex at a reduced pressure to form a two-phase stream consisting of a liquid phase and a vapor phase, causing said heated stream to pass through an elongated cylindrical evaporation zone under conditions designed to provide annular flow and equilibrium between the vapor and the liquid phase and suppress foaming and spray flow,

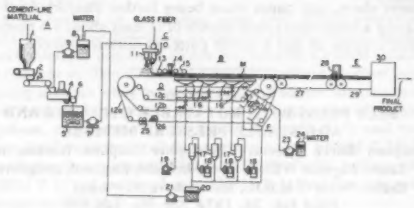
B. subjecting the equilibrated stream of step (A) to centrifugal forces in the outlet end of said evaporation zone, and

C. adiabatically separating said liquid phase from said vapor phase by further centrifugal and gravitational forces in a separation zone, said liquid phase being the concentrated latex and said vapor phase being substantially all evaporated water; wherein the latex is a latex of a rubbery polymer and it is heated to 130°–155°F and is fed to the vaporization zone at 30–45 U.S. gallons per minute and a vacuum of about 0.6 psia is maintained in the vaporization zone of which the diameter and length are 1.5 and 10 feet respectively.

3,974,024
PROCESS FOR PRODUCING BOARD OF CEMENT-LIKE MATERIAL REINFORCED BY GLASS FIBER

Tsuyoshi Yano, Tokyo; Kazumasa Ichikawa, Koganei; Takao Take, Mitako, and Tetsuro Sasano, Chiba, all of Japan, assignors to Onoda Cement Company, Ltd., Japan

Filed Mar. 27, 1974, Ser. No. 455,351
Claims priority, application Japan, Apr. 18, 1973, 48-43106; Apr. 18, 1973, 48-43107; Apr. 18, 1973, 48-43108; May 21, 1973, 48-33394
Int. Cl.² B28B *1/08;* **B32B** *5/26, 5/32, 31/18*
U.S. Cl. 162—101 **3 Claims**



1. A process for continuously producing a dense board of cement-like material reinforced by glass fibers, said process comprising:

preparing a slurry of cement-like material selected from the group consisting of water-curable powdered cement and gypsum having a particle size of 40μ – 200μ;

spraying said slurry and glass fibers having a fiber length of 10 mm – 50 mm in an amount of 2 – 30% by weight simultaneously onto a suction conveyor in such a manner that the slurry and the glass fibers intersect on the suction conveyor to form a dense mat of a thickness of 3 – 50 mm having said glass fibers intimately disposed substantially two-dimensionally with respect to the surface of said suction conveyor;

dehydrating said dense mat on said conveyor by pulse-like intermittent suction using at least one suction box before the cement-like material begins to set; and

cutting said dehydrated dense mat into predetermined board lengths.

2. A process for continuously producing a light board of air-dispersed cement-like material reinforced by glass fibers, said process comprising: :

preparing a slurry of cement-like material selected from the group consisting of water-soluble powdered cement and gypsum of a particle size of less than 200μ having air dispersed therein;

spraying said air-dispersed slurry and glass fibers having a fiber length of 10 – 50 mm in an amount of 0.5 – 5% by

weight simultaneously onto a conveyor belt in such a manner that said air-dispersed slurry and said glass fibers intersect on the conveyor to form an air-dispersed mat of a thickness of 20 – 150 mm having said glass fibers intimately disposed substantially two-dimensionally with respect to the surface of said conveyor; and

cutting said air-dispersed mat into predetermined board lengths.

3,974,025

ABSORBENT PAPER HAVING IMPRINTED THEREON A SEMI-TWILL, FABRIC KNUCKLE PATTERN PRIOR TO FINAL DRYING

Peter G. Ayers, West Chester, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 457,043, April 1, 1974, Pat. No. 3,905,863, which is a continuation-in-part of Ser. No. 368,440, June 8, 1973, abandoned. This application June 19, 1975, Ser. No. 588,580

The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.

Int. Cl.² D21H *5/24;* **B31F** *1/12*

U.S. Cl. 162—113 **4 Claims**

1. A soft, bulky and absorbent creped paper sheet characterized by having a uniform basis weight of from about 5 to about 40 pounds per 3,000 square feet, by having imprinted in its surface, to a depth of at least 30 percent of its machine glazed caliper, the knuckle pattern of the back side of a semi-twill imprinting fabric having about 20 to about 60 meshes per inch, by having about 20 to about 50 percent of its surface compressed in said dot-dash knuckle pattern such that the long axis of the dash impressions in said pattern is aligned parallel to the machine direction during the formation of said paper sheet, said paper sheet being further characterized by having a cross-directional stretch of at least about 3.5 percent after creping of said knuckle pattern-imprinted sheet.

3,974,026

BELT PRESS WITH ROTATABLE CYLINDER AND ADJUSTABLE PRESSURE MEMBER

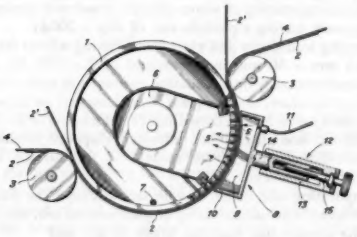
Stephen Derek Emson; Christopher Stephen Norton, and James Royston Wilson, all of Sheffield, England, assignors to Escher Wyss G.m.b.H., Ravensburg, Germany

Filed Feb. 28, 1974, Ser. No. 446,969

Claims priority, application Switzerland, Mar. 1, 1973, 2995/73

Int. Cl.² D21F *3/06*

U.S. Cl. 162—358 **4 Claims**



1. A belt press comprising

a rotatable cylinder, a guide belt guided over a peripheral portion of said cylinder to confine material to be pressed therebetween,

a pressure member having at least one chamber for connection to a means for supplying a pressure medium, said chamber being disposed adjacent said guide belt, said pressure member further having an arcuate portion corresponding to the shape of said cylinder and disposed in opposition to said peripheral portion of said cylinder, said means defining at least one aperture in said arcuate portion to communicate with said chamber, and

an adjusting means for adjusting the distance of said pressure member from said belt, said adjusting means including a stationary guide, a pin mounted on said pressure member and guided in said guide, and an adjusting screw engaging said pin and rotatably mounted in said guide.

3,974,027

NUCLEAR REACTOR INSTALLATION

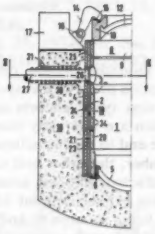
Eberhard Michel, Nurnberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 25, 1974, Ser. No. 464,238

Claims priority, application Germany, Apr. 30, 1973, 2321846

Int. Cl.² G21C *11/08*

U.S. Cl. 176—38 **3 Claims**



1. A water-cooled nuclear reactor installation comprising a metal pressure vessel having a vertical substantially cylindrical side wall having an upper portion and coolant pipes radiating from said upper portion, a concrete pit in which said vessel is positioned and forming a concrete wall surrounding said vessel at a radial distance therefrom defining an annular space around the vessel, said space when empty having a radial extent permitting instrumentation to be lowered into said space for inspecting the vessel's said side wall, said space being substantially filled by a rupture-protecting encasement for the vessel's said wall; said encasement comprising a shell formed by individual-separable segmentally-cylindrical segments interfitted to form at least one substantially cylindrical layer encasing the vessel's said side wall, said segments being made of pressure-resistant heat-insulating non-metallic material and the segments subdividing said layer in the radial and axial direction of the vessel's said side wall and said shell being encircled by high-tensile strength metal rings; said metal pressure vessel radially expanding thermally when said vessel is hot and said shell thermally insulating said metal rings against heat from said vessel so that said rings do not correspondingly thermally expand, said rings therefore applying radial compression via said shell to the vessel's said side wall to provide said rupture-protecting encasement when said vessel is hot, said metal pressure vessel thermally contracting radially when cool and said metal rings then releasing said compression, whereby to permit upward removal of said segments, segment-by-segment, when said vessel is cool, and freeing said space from said segments, to permit said inspection.

3,974,028

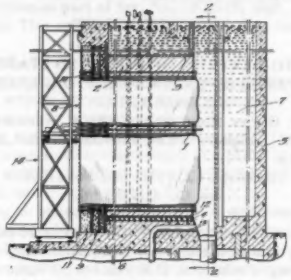
REACTOR AND METHOD OF OPERATION

John A. Wheeler, Princeton, N.J., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 24, 1946, Ser. No. 671,997

Int. Cl.[2] G21C *5/02*

U.S. Cl. 176—50 1 Claim



1. A water-cooled neutronic reactor comprising a core consisting of a mass of graphite 36 feet high, 36 feet wide, and 28 feet deep, having a lattice consisting of 2004 equally spaced horizontal, parallel passages of uniform length extending therethrough, said passages being 1.611 inches in diameter, aluminum-jacketed short rods of uranium disposed in end-to-end abutting relationship in 1500 central passages comprising an active zone of the reactor, the radius of the active zone being 14 feet, said central passages being otherwise empty, the uranium rods being surrounded by an annular water space 0.086 inch in thickness, the total length of fissionable material in the passages being smaller at the axis of the reactor than at the edge of the reactor and the total length of fissionable material in each passage being given in FIG. 3 of the drawing, thereby obtaining a flattened flux as indicated by curve X in FIG. 4 of the drawing.

3,974,029

NUCLEAR REACTORS WITH AUXILIARY BOILER CIRCUIT

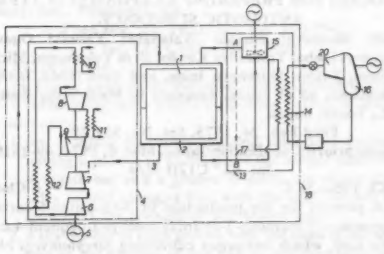
Brian Victor George, Willoughby Waterleys, and Reginald Kenneth Cook, Kibworth Harcourt, both of England, assignors to Nuclear Power Company (Whetstone) Limited, Leicester, England

Filed June 10, 1974, Ser. No. 477,636

Claims priority, application United KingdomK, June 8, 1973, 27344/73

Int. Cl.[2] G21C *15/22*

U.S. Cl. 176—60 11 Claims



1. A gas-cooled nuclear reactor having

A. a main circulatory system which includes a portion passing through the reactor core,

B. a gaseous coolant flowing through said circulatory system,

C. said circulatory system including at least one main energy converting unit, and

D. an auxiliary circulatory system for the gaseous coolant,

I. said auxiliary system including

i. at least one steam generating boiler heatable by the gaseous coolant after its passage through the reactor core,

ii. said boiler being heatable continuously so long as the reactor core is at an elevated temperature to generate steam continuously,

iii. an auxiliary steam turbine,

iv. means continuously leading steam from the steam generating boiler to the auxiliary steam turbine, and

v. a load driven by the auxiliary steam turbine.

3,974,030

PROCESS FOR PRODUCING YEAST CELLS

Tadao Kobayashi, Saga; Akio Yamanoi, Tokyo, and Shin-Ichiro Otsuka, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed June 5, 1975, Ser. No. 584,152

Claims priority, application Japan, June 10, 1974, 49-65822

Int. Cl.[2] C12B *1/00*

U.S. Cl. 195—27 7 Claims

1. A method or producing yeast cells which comprises culturing a yeast belonging to species *Debaryomyces vanriji*, *Saccharomyces coreanus*, *Pichia polymorpha*, *Candida cloacae* or *Candida guilliermondii* in an aqueous culture medium containing soybean whey as a major nutrient source for growth of said yeast until the cells of said yeast propagate in said culture medium, and recovering the propagated cells from said medium, said yeast being *Debaryomyces vanriji* FERM P-1865, *Saccharomyces coreanus* FERM P-2606, *Pichia polymorpha* FERM P-120, *Candida cloacae* FERM P-410 or *Candida guilliermondii* FERM P-730.

3,974,031

PROCESS FOR PRODUCING L-CYSTEINE OR ITS DERIVATIVES

Hideaki Yamada; Hidehiko Kumagai, both of Kyoto, and Haruyiki Ohkishi, Sagamihara, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

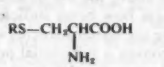
Filed May 6, 1975, Ser. No. 575,009

Claims priority, application Japan, May 9, 1974, 49-51496; May 10, 1974, 49-51926

Int. Cl.[2] C12D *13/06*

U.S. Cl. 195—29 22 Claims

1. A process for producing L-cysteine and derivatives thereof of the formula (I):



(I)

wherein R is selected from the group consisting of hydrogen, $C_1 - C_{15}$ alkyl, $C_2 - C_{15}$ alkenyl, $C_6 - C_{15}$ aryl, $C_7 - C_{15}$ aralkyl, which comprises reacting β-substituted-L-alanine having the formula (II):

$$X-CH_2\underset{\underset{NH_2}{|}}{C}HCOOH \qquad (II)$$

wherein X is selected from the group consisting of halogen, $-OR'$ and $-SR'$, wherein R' is selected from the group consisting of hydrogen, allyl, C_1-C_{18} alkyl, C_6-C_{18} aryl and C_7-C_{18} aralkyl, with a thiol, or hydrogen sulfide, of the formula (III):

$$R-SH \qquad (III)$$

wherein R is as defined above, ammonium hydrosulfide or a metal hydrosulfide of the formula (IV):

$$R-S-Y \qquad (IV)$$

wherein R is hydrogen, and Y is ammonium or a metal, in an aqueous medium, in the presence of cysteine desulfhydrase.

3,974,032

LOW D.E. STARCH HYDROLYSATES OF IMPROVED STABILITY PREPARED BY ENZYMATIC HYDROLYSIS OF DEXTRINS

Clarence F. Harjes, Hinsdale; Harry W. Leach, Chicago, and John M. Trp, Argo, all of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Mar. 5, 1973, Ser. No. 337,796
Int. Cl.² C12D *13/02*
U.S. Cl. 195—31 R **18 Claims**

1. A low D.E. starch hydrolysate having a D.E. in the range of from about 9 to about 20, a relatively narrow molecular weight distribution such that its weight average molecular weight to its number average molecular weight ratio of $\overline{M}w/\overline{M}n$ is less than about 20 and said hydrolysate being further characterized as containing less than about 20% by weight, dry basis, of starch oligosaccharides having a degree of polymerization greater than about 200.

7. A highly concentrated, non-brazing low D.E. syrup comprising a starch hydrolysate having a D.E. in the range of from about 9 to about 20, a relatively narrow molecular weight distribution such that its weight average molecular weight to its number average molecular weight of $\overline{M}w/\overline{M}n$ is less than about 20 and being further characterized as having less than about 20% by weight, dry basis, of starch oligosaccharides having a degree of polymerization greater than about 200, which when dissolved in water to a solids content of at least about 50% by weight, remains substantially hazefree over a relatively long period of time.

11. A process for producing a low D.E. starch hydrolysate of improved stability which comprises treating a starch dextrin having a degree of branching between about 7% and about 16% with a bacterial alpha-amylase enzyme at a temperature of from about 60°C to about 85°C to achieve a hydrolysate product having a D.E. in the range of from about 9 to about 20, whereby a stable, haze-free starch hydrolysate syrup is produced.

13. A process for producing a low D.E. starch hydrolysate which comprises:

a. dextrinizing starch by introducing a bed of starch powder into a vessel, maintaining an upward flow of gas through said bed by introducing the gas from beneath said bed and withdrawing it from an outlet above the top of said bed, the upward velocity of said gas flow being sufficient to suspend and vigorously agitate the starch particles within said bed but insufficient to convey a substantial portion of the starch out through said upward outlet, heating said bed in said agitated condition to dextrinizing temperature and maintaining said dextrinizing temperature to provide a starch dextrin having a degree of branching of at least about 7%,
b. cooling said bed of agitated starch and withdrawing said starch dextrin from said vessel,
c. subjecting a mixture of said starch dextrin and water at a solids content less than about 50% by weight, dry basis, to the hydrolytic action of bacterial alpha-amylase at a temperature of about 60°C to about 85°C and a pH of from about 6 to about 9 to achieve a hydrolysate product having a D.E. of from about 9 to about 20,
d. stopping the hydrolytic reaction, and
e. recovering the hydrolysate so produced.

3,974,033

MALTO-DEXTRINS OF IMPROVED STABILITY PREPARED BY ENZYMATIC HYDROLYSIS OF OXIDIZED STARCH

Clarence F. Harjes, Hinsdale, and Vilas L. Wermers, Lemont, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Sept. 12, 1975, Ser. No. 612,988
Int. Cl.² C12D *13/02*
U.S. Cl. 195—31 R **17 Claims**

1. A process for the preparation of an oxidized maltodextrin comprising treating in a first step an aqueous slurry of oxidized starch having a minimum D.S. (carboxyl) value within the range of about 0.2 to about 1.5 with an acid or an enzyme to liquefy and hydrolyze the oxidized starch to a D.E. not substantially above about 7 and to provide a liquefied hydrolysate substantially free of residual oxidized starch granules and thereafter in an enzymatic conversion step, treating the liquefied hydrolysate with a saccharifying enzyme to produce an oxidized starch hydrolysate having a D.E. not substantially above 20.

3,974,034

MALTO-DEXTRINS OF IMPROVED STABILITY PREPARED BY ENZYMATIC HYDROLYSIS OF OXIDIZED STARCH

Harold E. Horn, Oak Lawn, and Bruce A. Kimball, Chicago, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Sept. 12, 1975, Ser. No. 612,989
Int. Cl.² C12D *13/02*
U.S. Cl. 195—31 R **9 Claims**

1. A process for the preparation of an oxidized malto-dextrin, comprising treating in a first step an aqueous slurry of starch with an oxidizing agent at a temperature of at least about 100°C to simultaneously oxidize and liquefy the starch to provide a oxidized and liquefied starch having a D.S. (carboxyl value) within the range of from about 0.2 to about 1.5 said slurry being substantially free to residual starch granules, and thereafter, in an enzymatic conversion step, treating the oxidized and liquefied starch with an alpha-amylase enzyme preparation to produce an oxidized starch hydrolysate having a D.E. not substantially above about 20.

3,974,035

PROCESS FOR PREPARING A CEPHAMYCIN TYPE ANTIBIOTIC SUBSTANCE

Takashi Shomura; Hiroshi Watanabe; Yasuaki Ogawa; Kazunori Ohba; Yasumitsu Kondo, all of Yokohama; Michio Kojima, Tokyo; Shigeharu Inoje, and Taro Niida, both of Yokohama, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Feb. 24, 1975, Ser. No. 552,281
Claims priority, application Japan, Mar. 6, 1974, 49-25107
Int. Cl.² C12D *9/14*
U.S. Cl. 195—36 C **6 Claims**

1. A process for the production of 7-(5-amino-5-carboxyvaleramido)-7-methoxy-3-hydroxy-methyl-3-cephem-4-carboxylic acid, which comprises cultivating *Streptomyces chartreusis* SF-1623 (ATCC 21999) or a mutant thereof in a culture medium under aerobic conditions whereby said carbox-

ylic acid is produced, and recovering said carboxylic acid from the culture medium.

3,974,036

PROCESS FOR CONDITIONING BACTERIAL CELLS CONTAINING GLUCOSE ISOMERASE ACTIVITY

Raymond Lee Snell, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 502,619, Sept. 3, 1974, abandoned. This application July 7, 1975, Ser. No. 593,257
Int. Cl.² C12B 1/00
U.S. Cl. 195—65 6 Claims

1. A process for conditioning bacterial cells having glucose isomerase activity for subsequent use to produce a fructose-containing product which comprises

a. mixing the bacterial cells at about 10°–27°C. with water or an aqueous dextrose solution at a pH of about 8 measured at 25°C. until the cells are hydrated and pH equilibrated; and

b. passing an aqueous dextrose solution up through a bed of such bacterial cells at a temperature of about 60°C. and at a pH of 7.5–8.0 measured at 60°C. until the effluent solution is clear and the pH thereof is stabilized at 7.5–8.0 measured at 60°C; or passing water at a temperature of about 10°–27°C. and at a pH of 8.0 measured at 25°C. up through a bed of such bacterial cells until the effluent solution is clear and the pH thereof is stabilized at 8.0 measured at 25°C., followed by the step of passing an aqueous dextrose solution up through the bed at a temperature of about 60°C. and at a pH of 7.5–8.0 measured at 60°C. until the effluent solution has the same dextrose content as the entering dextrose solution.

3,974,037

PROCESS FOR MEASURING CARBON DIOXIDE CONTENT OF THE BODY FLUID

Thomas H. Adams, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 1, 1973, Ser. No. 328,634
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 R 21 Claims

1. A process for determining the carbon dioxide content of a body fluid which comprises: mixing measured amounts of said body fluid with excess amounts of phosphoenol pyruvate, phosphoenol pyruvate carboxylase, malate dehydrogenase and the reduced form of nicotinamide adenine dinucleotide and measuring the change in the concentration of the reduced form of nicotinamide adenine dinucleotide in the mixture so formed while maintaining the system at a substantially constant temperature and a substantially constant pH of about 7.5 to about 10.5.

3,974,038

COKE OVEN DOOR

Linwood G. Tucker, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Dec. 22, 1971, Ser. No. 210,704
Int. Cl.² C10B 1/06, 25/06
U.S. Cl. 202—248 1 Claim

1. In a coke oven door, the improvement comprising:

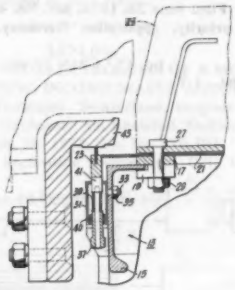
a. a rectangular door frame supporting a sealing assembly including:

1. an elongate bar encompassing said door frame and having a groove in each one of the longer sides of said elongate bar and a groove in each one of the shorter sides of said elongate bar, with the said grooves intersecting at the corners of said frame; and

2. a sealing bar in each groove with the ends of the sealing bars in the grooves of one pair of opposite sides at said corners overlapping the ends of the sealing bars in the grooves of the other pair of opposite sides.

b. a plurality of side stops mounted to said door frame, each said stop comprising:

1. a plate member pivotally mounted to said door frame; and



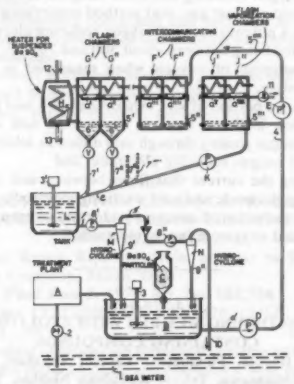
2. a replaceable shoe attached to said plate, with said plate and said shoe coacting with one of said elongate bars.

3,974,039

ADDITION OF FINELY DIVIDED $BaSO_4$ PARTICLES TO SEA WATER FOR REMOVAL OF SCALE COMPONENTS

Klaus Frohner, and Hossein Panahandeh, both of Geesthacht, Germany, assignors to Gesellschaft fur Kernenergieverwertung in Schiffbau und Schiffahrt mbH, Geesthacht-Tesperhude, Germany

Filed Nov. 4, 1974, Ser. No. 520,841
Claims priority, application Germany, Nov. 2, 1973, 2354727; May 28, 1974, 2425670
Int. Cl.² B01D 3/34; C23F 11/00, 14/00
U.S. Cl. 203—7 18 Claims



1. In a process for reducing scale deposition in a distillation apparatus used for distilling sea water, the improvement comprising adding barium sulphate in the form of finely divided particles in suspension to said sea water, maintaining said sea water continuously in motion, thereby maintaining said particles in constant suspension in said sea water, and heating said sea water with said barium sulphate particles in suspension to a temperature at which the calcium sulphate present in said sea water is supersaturated, said particles acting as precipitation nuclei for said calcium sulphate initially present in said sea water.

3,974,040

CONTROLS FOR MAINTAINING LOW NITROGEN OXIDES CONTENT IN INTERNAL COMBUSTION ENGINE EXHAUST GASES

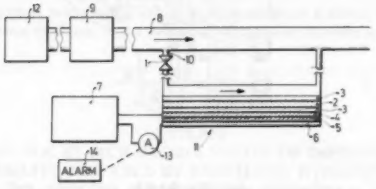
Hans Siebke; Brigitte Moro; Manfred Schönborn, and Horst Jahnke, all of Gerlingen, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 28, 1974, Ser. No. 484,301

Claims priority, application Germany, July 12, 1973, 2335403

Int. Cl.² G01N 27/46

U.S. Cl. 204—1 T 9 Claims



1. A method for monitoring the nitrogen oxides and oxygen content of exhaust gas from an internal combustion engine using a sensor cell which comprises

a. a catalytic oxygen reducing electrode which also reduces nitrogen oxides at potentials below the rest potential of oxygen,

b. an oxidizing electrode,

c. an aqueous electrolyte connecting said electrodes, and

d. a porous gas diffusion inhibitor layer covering the side of said oxygen reducing electrode adapted to be contacted with said exhaust gas; said method comprising

applying a potential to said oxygen reducing electrode, said potential being between about 300 and 700 mV below the rest potential of oxygen when measured in the same electrolyte,

contacting a portion of said exhaust gas with said porous gas diffusion inhibitor layer, a portion of said contacting exhaust gas passing through said diffusion inhibiting layer to said oxygen reducing electrode, and

measuring the current that flows between said oxygen reducing electrode and said oxidizing electrode as a result of the reduction of nitrogen oxides and oxygen in contact with said oxygen reducing electrode.

3,974,041

IMAGE RECORDING MEMBER WITH ZEOLITIC WATER CONTAINING COMPOUNDS

Masahiro Haruta, Funabashi; Yasushi Takatori, Machida; Akemi Shimosawa, Tokyo; Katsuhiko Nishide, Yokohama, and Mitsunobu Nakazawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

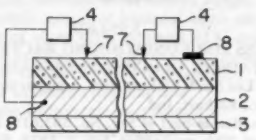
Filed Dec. 5, 1974, Ser. No. 529,933

Claims priority, application Japan, Dec. 10, 1973, 48-139763; Dec. 10, 1973, 48-139764

Int. Cl.² B41M 5/20; G01D 15/34

U.S. Cl. 204—2 31 Claims

1. An electrical recording member comprising a support and a recording layer thereon which comprises a binder having uniformly dispersed therein an electrically-conductive agent, an image-forming component and a reducing agent, said electrically-conductive agent being a zeolitic water-containing compound and said image-forming component being a member selected from the group consisting of reduction-



type image-forming agents, oxidation-type image-forming agents and pH indicators.

3,974,042

METHOD AND APPARATUS FOR ELECTROPLATING

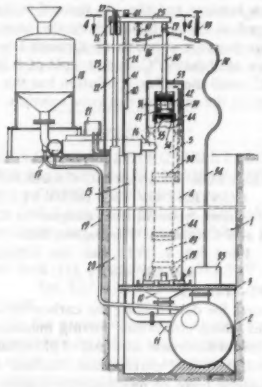
Sergio Angelini, Milan, Italy, assignor to Brevetti Elettrogalvanici Superfiniture, Eschen, Liechtenstein

Filed Apr. 9, 1975, Ser. No. 566,219

Claims priority, application Switzerland, Apr. 27, 1974, 5805/74

Int. Cl.² C25D 5/02

U.S. Cl. 204—25 18 Claims



1. Apparatus for electroplating the surface of a vertically disposed pipe, bar, cylinder or the like which comprises:

a plating electrolyte container;

a plating zone having an upper and a lower end;

an electrode within said zone;

means for continuously admitting electroplating electrolyte under pressure into said zone;

sealing means in close proximity with the surface at at least one end of said zone for retaining electrolyte in said zone;

the electrolyte within said zone substantially filling the same and contacting an exposed area of the surface;

said electrode being in a directly opposed or face-to-face relationship to the exposed area;

said sealing means being adapted to permit electrolyte to pass out of the plating zone;

means for conducting the passed electrolyte to the container;

means for convering electrolyte under pressure from the container to the plating zone;

means for moving said plating zone vertically along the surface; and

means for supplying electric current to the electrode and said surface for causing the surface to be plated at the exposed area.

3,974,043

MAKING A STABILIZED SUPERCONDUCTOR

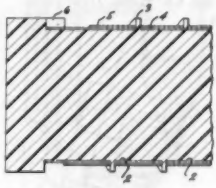
Werner Sczepaniak, Windeck, and Werner Materne, Opsen, both of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Apr. 25, 1975, Ser. No. 571,694

Claims priority, application Germany, Mar. 27, 1974, 2414744

Int. Cl.² C25D 5/34, 5/50

U.S. Cl. 204—29 7 Claims



1. In a method for making a stabilized superconductor, wherein a niobium or niobim alloy strip, tape or ribbon has one of its surfaces treated in that copper particles are brushed on and into that surface, a continuation of that method comprising the steps of electrolytically copper-plating said surface to obtain a thin coating of which said particles become a part; annealing the copper plated strip, tape or ribbon in protective gas or vaccuum; and continuing electrolytically copper plating following the annealing for increasing the thickness of said coating to a substantial degree.

3,974,044

BATH AND METHOD FOR THE ELECTRODEPOSITION OF BRIGHT NICKEL-IRON DEPOSITS

Robert Arnold Tremmel, Woodhaven, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed Mar. 31, 1975, Ser. No. 563,758

Int. Cl.² C25D 3/56

U.S. Cl. 204—43 T 10 Claims

1. An aqueous acidic bath suitable for the electrodeposition of a bright iron-nickel electrodeposit onto a substrate susceptible to corrosion, which comprises iron ions and nickel ions, the ratio of nickel ions to iron ions being from bout 5 to about 50 to 1, an organic sulfo-oxygen compound as a bath soluble primary nickel brightener present in an amount of from about 0.5 to 10 grams per liter, and 2 to 100 grams per liter of a bath soluble complexing agent which is a hydroxy aliphatic carboxylic acid having 1 to 3 carboxyl groups, 2 to 8 carbon atoms and 1 to 6 hydroxyl groups, the ratio of complexing agent to iron ions concentration in the bath being from 1 to about 20 to 1, the bath having a pH from 3.0 to about 4.6, and from about 1 to about 50 grams per liter of a reducing saccharide.

3,974,045

METHOD FOR ELECTROPLATING BRIGHT ZINC

Akio Takahashi, Kisarazu; Atsushi Fukuda, and Toshio Igarashi, both of Tokyo, all of Japan, assignors to Dipsol Chemicals Co., Ltd., Tokyo, Japan

Division of Ser. No. 448,545, March 6, 1974, abandoned. This application Nov. 25, 1974, Ser. No. 526,950

Int. Cl.² C25D 3/22, 3/24

U.S. Cl. 204—55 R 9 Claims

1. A method for the electrodeposition of a bright zinc, which comprises:

electrodepositing the zinc from an aqueous zinc electrode depositing bath comprising an aqueous solution containing a source of zinc ions and an effective amount, sufficient to yield a bright zinc electrodeposit, of a water soluble polymer prepared by the reaction of at least one epihalohydrin with at least one nitrogen heterocyclic compound selected from the group consisting of imidazole, pyrrole, piperazine and compounds thereof, and at least one compound selected from the group consisting of aliphatic amines, hexamethylene tetramine and ammonia, wherein 0.2 – 5 moles of said epihalohydrin is reacted with 0.2 – 10 moles of said aliphatic amine, ammonia or hexamethylene tetramine per mole of said nitrogen heterocyclic compound at 50°– 100°C.

3,974,046

PROCESS FOR THE ELECTROLYSIS OF A MOLTEN CHARGE USING INCONSUMABLE ANODES

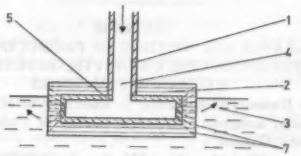
Hanspeter Alder, Flurlingen, Switzerland, assignor to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland

Filed Sept. 30, 1974, Ser. No. 510,303

Claims priority, application Switzerland, Oct. 16, 1973, 14609/73

Int. Cl.² C25C 3/06, 3/12

U.S. Cl. 204—67 10 Claims



1. In a process for operating a cell for the electrolysis of a molten charge containing aluminum oxide, the cell being of the type including at least one non-consumable anode comprising at least a section composed of a ceramic oxide material and defining a working surface, at least a portion of said working surface being in contact with said molten charge and having a certain current density distribution,

at least a part of said portion of said working surface having a current density less than about 0.001 amps per square centimeter,

the step comprising contacting said part with an oxidizing gas, whereby corrosion of said working surface is substantially inhibited.

5. The process as claimed in claim 1, wherein said oxidizing gas is selected from the group consisting of oxygen, air, chlorine, fluorine, carbon dioxide, nitrogen oxide, or mixtures thereof.

3,974,047

ELECTROLYTIC CATION EXCHANGE PROCESS FOR CONJOINT MANUFACTURE OF CHLORINE AND PHOSPHATE SALTS

Floyd Lester Ramp, Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

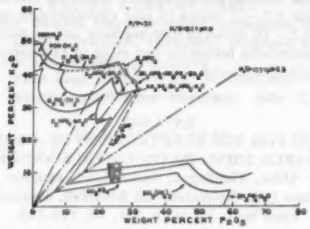
Filed June 2, 1975, Ser. No. 582,706

Int. Cl.² C25B 1/00, 1/02, 1/26, 11/12

U.S. Cl. 204—90 13 Claims

1. In a method of producing elemental chlorine by electrolysis of an alkali metal chloride and phosphoric acid in aqueous solution, the improvement which comprises placing a hot aqueous concentrated anolyte solution of said alkali metal chloride in contact with one side of the cation exchange membrane and a hot aqueous catholyte solution of phosphoric acid containing from about 10% to about 70%/wt. of phosphoric acid in contact with the other side of said membrane, using a graphite cathode in the catholyte solution, passing a direct current in series through said solutions and membrane, said cation exchange membrane having a concentration of multivalent anions between about 0.2 and about 10N with the great preponderance of said anions being electrostatically trapped in the ion exchange channels of said membrane, and said

solutions being at a temperature between about 90° and about 100°C, collecting chlorine gas from said anolyte solution,



collecting hydrogen gas from said catholyte solution, and recovering as a product from said catholyte solution at least a portion of an alkali metal phosphate formed therein.

3,974,048

APPARATUS AND METHOD OF PRODUCING HEAVY WATER INVOLVING CATALYTIC-ELECTROLYTIC EXCHANGE PROCESSES

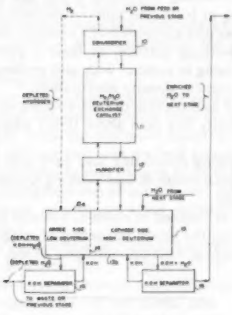
Martin Hammerli, and John P. Butler, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 19, 1975, Ser. No. 559,763

Claims priority, application Canada, May 3, 1974, 198793

Int. Cl.² C25B *1/10, 1/02*

U.S. Cl. 204—101 **10 Claims**



1. A method of producing heavy water involving a composite catalytic-electrolytic deuterium exchange process comprising passing liquid water from feed or a previous enrichment stage through a catalytic deuterium exchange region containing a hydrogen gas/liquid water deuterium exchange catalyst and then through an electrolytic cell region, said cell including an anode and cathode connected to an electrical power supply and separated from each other by an electrolyte permeable diaphragm and an electrolyte, passing hydrogen gas in countercurrent relation to the liquid water through the catalytic deuterium exchange region to effect deuterium exchange between the gas and the liquid and then to the electrolytic cell where the hydrogen gas is at least partially consumed by the anode and hydrogen gas is evolved at the cathode, passing the hydrogen gas evolved at the cathode to the catalytic exchange region to pass therethrough, taking the water from the anode side of the electrolytic cell, said water being depleted in deuterium and passing to waste or back to a previous stage, and taking as output a portion of the water from the cathode side of the electrolytic cell, said water being enriched in deuterium and passing to further enrichment stages.

3,974,049

ELECTROCHEMICAL PROCESS

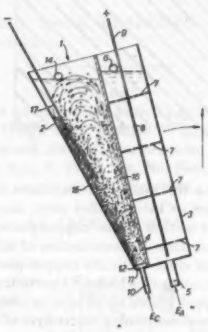
George Stephen James, Johannesburg; Bruce Ian Dewar, Randburg, and Walter Rudolf Moergeli, Maraisburg-Roodepoort, all of South Africa, assignors to Parel. Societe Anonyme, Luxembourg, Luxembourg

Filed July 30, 1974, Ser. No. 493,645

Claims priority, application South Africa, Aug. 3, 1973, 73/5310; Aug. 3, 1973, 73/5311; Dec. 14, 1973, 73/9490; Dec. 14, 1973, 73/9491; Dec. 14, 1973, 73/9494; May 24, 1974, 74/3330

Int. Cl.² C25C *1/12, 7/02*

U.S. Cl. 204—106 **16 Claims**



1. In an electrochemical process wherein an electrolyte is passed through one electrode compartment of an electrochemical cell, said one electrode compartment containing a particulate electrode which comprises a mass of discrete electroconductive particles and being separated from a second electrode compartment of said electrochemical cell containing a counter-electrode by a separator having an ion-permeable wall, the improvement which comprises (a) controlling the distribution of the particles of said particulate electrode in the electrolyte during the process in a manner such that there are present within said mass a first region which is adjacent to the ion-permeable wall and within which first region the average number of particles per unit volume is relatively small so that at any given time substantially all of the particles are separated from each other, and a second region which is spaced from the ion-permeable wall and within which second region the average number of particles per unit volume is relatively great so that at any given time substantially all the particles are in contact with other particles, and (b) establishing a circulation pattern in said one electrode compartment such that particles circulate along paths passing through said first and second regions.

3,974,050

METHOD OF AND APPARATUS FOR PROCESSING THE SURFACE OF BODIES

Jiri Divisek; Wolfgang Faul, and Bertel Kastening, all of Julich, Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Continuation of Ser. No. 296,549, Oct. 11, 1972, abandoned. This application Mar. 17, 1975, Ser. No. 559,339

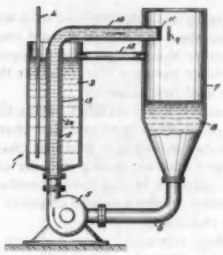
Claims priority, application Germany, Oct. 12, 1971, 2150748

Int. Cl.² B23P *1/00, 1/02, 1/12*

U.S. Cl. 204—129.6 **12 Claims**

1. The method of removing selected portions of a layer of a conducting material on a non-conducting base, comprising in combination exposing said conducting material to an electrolyte which is substantially inert to said conducting material, establishing a difference in potential between anode and cathode poles which are spaced from said conducting material in

said electrolyte, transferring electrical charges from said anode pole to discrete, electrically conducting charge carrier particles in the form of powdered material, said particles being maintained movable and in suspension in said electrolyte and



prevented from contact with said cathode pole, and transferring charges from said carriers to said conducting material to form ions of said conducting material, so that ions of said conducting material move through said electrolyte toward said cathode pole.

3,974,051

PRODUCTION OF HYPOCHLORITE FROM IMPURE SALINE SOLUTIONS

Joseph E. Elliott; Neil W. Stillman, both of Madison, and John E. Bennett, Painesville, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed May 7, 1975, Ser. No. 575,333

Int. Cl.² C25B *1/24, 1/26, 11/02*

U.S. Cl. 204—149 **4 Claims**

1. A method for reducing the formation of hardness-caused cathode deposits upon the electrolysis of impure aqueous saline solutions, which method comprises:

a. providing the cathodes of an electrolytic cell in a flat, continuous form, the surfaces of said cathodes having a roughness level of less than 2.54×10^{-4} cm. and

b. passing said saline solution between said cathodes and opposed, paralled anodes during electrolysis at a velocity of from 0.3 meter/sec. to the number which is equal to the log expressed by the formula: Log velocity (in m/sec/3) = 1.0 − available Cl_2 concentration, in grams pr liter/4

3,974,052

PHOTOPOLYMERIZABLE COMPOSITIONS CONTAINING TRIKETONE/ALCOHOL ADDUCTS AS PHOTOSENSITIZERS

Nicholas Heap, and Jozef Nemcek, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

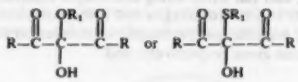
Filed Dec. 2, 1974, Ser. No. 528,924

Claims priority, application United Kingdom, Dec. 6, 1973, 56623/73

Int. Cl.² C08F *8/00, 2/46*

U.S. Cl. 204—159.15 **19 Claims**

1. A photopolymerisable composition consisting essentially of at least one polymerisable ethylenically unsaturated material and a photosensitiser present in a concentration in the range of 0.001% to 10% by weight of the ethylenically unsaturated material, said photosensitiser being an addition product of an organic 1,2,3-triketone and an organic alcohol or organic mercaptan, said addition product having the formula



where the groups R and R_1 may be same or different and each is a hydrocarbyl group or a substituted hydrocarbyl group or the groups R when taken together form part or the whole of a cyclic structure.

3,974,053

METHOD OF POLYMERIZING ETHYLENICALLY UNSATURATED MATERIALS BY IRRADIATION AND COMPOSITION FOR USE THEREIN

Josef Nemcek, and Nicholas Heap, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 19, 1974, Ser. No. 525,275

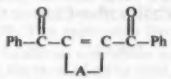
Claims priority, application United Kingdom, Nov. 19, 1973, 53581/73

Int. Cl.² C08F *8/00, 2/46*

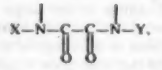
U.S. Cl. 204—159.15 **18 Claims**

1. A photopolymerizable composition consisting essentially of at least one polymerizable ethylenically unsaturated material and a photosensitive catalyst comprising

a. from 0.5 to 5% by weight based on the ethylenically unsaturated material of at least one photosensitizer having the structure



wherein Ph is phenyl, halogen-substituted phenyl, phenylene or halogen-substituted phenylene and A is a cyclic hydrocarbyl group, a halogen-substituted cyclic hydrocarbyl group or a group of the formula



where X and Y each is hydrogen, a hydrocarbyl or a halogen-substituted hydrocarbyl group, and

b. from 1 to 5% by weight based on the ethylenically unsaturated material of a reducing agent capable of reducing the photosensitizer when the photosensitizer is in an excited state.

3,974,054

MEASURING CELL FOR DETERMINING OXYGEN CONCENTRATIONS IN A GAS MIXTURE

Petrus Jacobus Poolman; Nabil Ahmed Abdalla, and Arend Harrewijne, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 12, 1974, Ser. No. 531,821

Claims priority, application Netherlands, Jan. 7, 1974, 7400147

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 S **8 Claims**

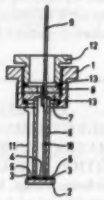
1. A cell for measuring the ratio between oxygen concentrations of two gas mixtures, comprising:

a hollow body for communicating one of the gas mixtures to an opening therein;

a flat partition sheet closing said opening and projecting therebeyond so that a first area of one side of said sheet is exposed to the gas mixture inside said hollow body while outside of said hollow body a second area of said one side may be simultaneously exposed to another gas

mixture, said flat sheet being electrolyte material which reversibly reacts with oxygen and is ion conductive;

electrically separate gas permeable electrodes on said first and second areas respectively; and



means for electrically contacting said electrodes to measure the voltage therebetween as a measure of the ratio between the oxygen concentrations to which said electrodes are exposed.

3,974,055

ALUMINUM ALLOY ANODE COMPOSITION

John Thomas Reding, and Robert Lee Riley, Jr., both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1974, Ser. No. 535,521

Int. Cl.² C23F *13/00*; C22C *21/10*

U.S. Cl. 204—197 **4 Claims**

1. An aluminum alloy useful as a sacrificial galvanic anode in the cathodic protection of ferrous structures, said aluminum alloy comprising:

a commercial grade of aluminum of 99.8 to about 99.9% purity containing, as naturally-occurring impurities about 0.02 to about 0.08% Si, about 0.02 to about 0.1% Fe, less than about 150 ppm Cu and minor amounts of other naturally-occurring impurities;

an amount of added indium in the range of about 0.01 to about 0.06% by weight of the total alloy weight;

an amount of added zinc in the range of about 0.5 to about 15.0% by weight of the total alloy weight; and

an amount of added silicon in the range of about 0.03 to about 0.4% by weight of the total alloy weight, the amount of added silicon plus the naturally-occurring silicon being at least about 0.07%.

3,974,056

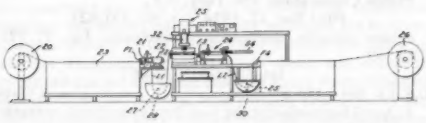
ELECTROPLATING SELECTED PORTIONS OF A STRIP

Kurt W. Jogwick, Livonia, Mich., assignor to Ann Arbor Circuits, Inc., Ann Arbor, Mich.

Filed May 23, 1975, Ser. No. 580,489

Int. Cl.² C25D *5/02*, *5/04*, *7/06*

U.S. Cl. 204—207 **19 Claims**



1. An apparatus for electroplating selected portions of a strip comprising

means for intermittently moving the strip through successive stations,

means at one of said stations for selectively electroplating selected portions of the strip,

said last-mentioned means comprising upper and lower press members,

means for moving said press members relative to one another toward and away from one another,

an upper mask of resilient material on said upper member,

a lower mask of resilient material on said lower member,

said lower mask having a plurality of openings therein having the configuration of the selected portion which is to be plated,

said mask engaging and gripping said strip when said upper and lower members are moved toward one another,

said lower member having a plurality of openings therein,

said lower member having a first chamber therein,

an outlet from said first chamber,

said openings in said lower member having their lower ends chamfered and extending to said first chamber,

a plurality of tubes mounted in said first chamber and having their upper ends extending into the chamfered portions of the openings in said lower member,

said lower member having a second chamber and an inlet to said second chamber,

means providing communication between said second chamber and the interior of said tubes such that electroplating solution may be passed through said inlet to said second chamber and, in turn, through each of said tubes to direct electroplating solution against the underside of the exposed selected portions of the strip, said solution thereafter passing along said chamfered portions to said first chamber and to the outlets.

15. An apparatus for electroplating selected portions of a strip comprising

means for intermittently moving the strip through successive stations,

means at one of said stations for selectively electroplating selected portions of the strip,

at least one solution treating tank comprising a bottom and sides for retaining treating solution,

an inlet,

an outlet,

said sides having notches therein for guiding said strip through said solution,

said tank having internal walls spaced longitudinally of the strip inwardly of said peripheral walls and having notches therin aligned with the notches in the peripheral walls.

3,974,057

ELECTRO PLATING BARREL

Hans Henig, Parsifalstrasse 6, Nuremberg 85, Germany

Continuation of Ser. No. 216,446, Jan. 10, 1972, abandoned. This application Jan. 28, 1974, Ser. No. 437,307

Claims priority, application Germany, Jan. 13, 1971, 2101332

Int. Cl.² C25D *17/20*

U.S. Cl. 204—213 **8 Claims**

1. An electroplating tumbling barrel for containing a batch of electrically conductive parts to be electroplated, which barrel comprises

a pair of spaced apart end walls;

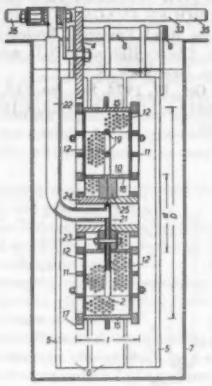
a generally cylindrical outer peripheral wall extending between the two said end walls and attached thereto at its ends;

a generally cylindrical inner peripheral wall extending between the end walls co-axially within the outer peripheral wall, the inner peripheral wall being attached to the end walls at its ends, the inner and outer peripheral walls and end walls together defining an annular treatment chamber;

at least one closable opening in the outer peripheral wall to allow the loading and unloading of parts into and out of the treatment chamber;

cathodic contact means for supplying electric current to parts contained within the treatment chamber; and

means mounting the end walls for rotation about the common axis of the inner and outer peripheral walls;



both end walls and the outer peripheral wall having formed therein a multiplicity of perforations and the length of the barrel measured parallel to its rotational axis being not more than one-half the average diameter measured normal to its rotational axis.

3,974,058

RUTHENIUM COATED CATHODES

Sudarshan D. Gokhale, Trenton, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Sept. 16, 1974, Ser. No. 506,510
Int. Cl.² C25B *1/14, 1/26, 9/00, 11/04*
U.S. Cl. 204—266 10 Claims

1. In an electrolytic cell for the production of halogen and caustic from alkali metal halide solutions wherein the cell is equipped with anodes, cathodes, and means separating said anodes from said cathodes, the improvement which comprises a composite cathode comprising a metal substrate having thereon an intermediate coating of cobalt and an overcoating of ruthenium.

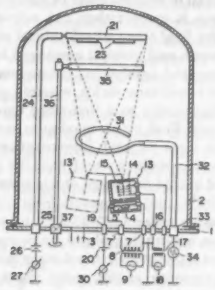
3,974,059

HIGH VACUUM ION PLATING DEVICE

Yoichi Murayama, Tosimaku Mejiro 3 tyome, 17 ban 23 go Mejiro Daiichi Kopo, Tokyo, Japan

Filed Oct. 3, 1974, Ser. No. 511,863
Int. Cl.² C23C *15/00*
U.S. Cl. 204—298 2 Claims

1. Apparatus for plating a compound film of particles on the surface of a body comprising, in combination: an evaporation chamber adapted to be connected to a source of high vacuum; a plurality of evaporation means disposed in said evaporation chamber including: a plurality of crucibles for accommodating different kinds of evaporant materials, each of said crucibles having a top opening; an ionization chamber mounted in superimposed position over each of said crucibles, each of said ionization chambers having a passageway therethrough and connected with said top openings, each of said ionization chambers having a cylindrical coil-shaped filament for emitting electrons and an anode concentrically mounted within said filament for attracting said electrons, said filament and anode being disposed in said passageway; a high frequency coil being disposed in a superimposed relationship over said ionization chambers, said coil being connected to a high frequency electric power source located outside of said evaporation chamber; and a holder for supporting said body in a superimposed relationship over said high frequency coil and connected to a high tension electric power source located outside of said evaporation chamber; each associated evaporation means and ionization chamber forming a unit, each said



unit being mounted with its axis tilted with respect to a vertical axis, said tilted axis being directed towards a substantially central portion of said holder.

3,974,060

PREPARATION OF HIGH V.I. LUBE OILS

Alexis Voorhies, Jr., and Glen P. Hamner, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 875,509, Nov. 10, 1969, Pat. No. 3,654,130. This application Dec. 29, 1971, Ser. No. 213,830
The portion of the term of this patent subsequent to Apr. 4, 1989, has been disclaimed.
Int. Cl.² C10G *23/02, 37/06*
U.S. Cl. 208—59 11 Claims

1. A process for producing high V.I. lubricating oils comprising contacting a petroleum oil feedstock in a first stage with hydrogen and a catalyst comprising an amorphous base containing from 0 to less than about 20 wt.% zeolite, on total catalyst, and a metal selected from Groups VIB and VIII of the Periodic Table, or the oxides or sulfides of said metals, or mixtures thereof, at a temperature ranging from about 650° to about 850°F., at a pressure ranging from about 1500 to about 5000 psig and at a liquid hourly space velocity ranging from about 0.1 to about 10.0 V/V/Hr., contacting at least a portion of the first stage effluent in a second stage at less severe conditions of temperature and space velocity with hydrogen and a zeolite-base catalyst comprising a faujasite base and hydrogenation component selected from the group consisting of the metals from Groups VIB and VIII of the Periodic Table, their oxides and sulfides and mixtures thereof, said second stage contacting conducted at a temperature ranging from about 450° to about 700°F., at a pressure ranging from about 1500 to about 5000 psig, and at a liquid hourly space velocity ranging from about 0.1 to about 10.0 V/V/Hr., so that conversion to products boiling below 650°F. in said second stage is below about 15%.

3,974,061

ISOMERIZATION OF C_5 AND C_6 ISOMERIZABLE HYDROCARBONS

Robert E. Quisenberry, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 16, 1974, Ser. No. 533,058
Int. Cl.² C10G *39/00*
U.S. Cl. 208—65 17 Claims

1. A process for isomerizing a hydrocarbon fraction having a boiling point range in the range from about 90° to about 210°F. and containing C_5 and C_6 isomerizable hydrocarbons which comprises subjecting said hydrocarbon fraction to a

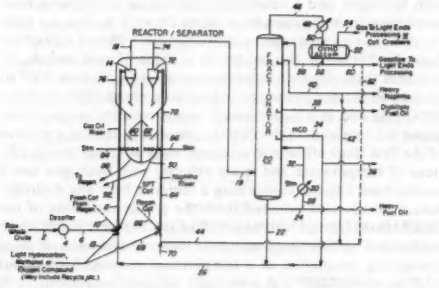
plural stage vapor phase catalytic isomerization operation, wherein the catalyst employed in each stage of said plural stage catalytic isomerization operation is chlorinated platinum-containing alumina catalyst, wherein the activity of the catalyst employed in the first stage of said plural stage isomerization operation is greater than the activity of the catalyst employed in the final stage of said plural stage isomerization operation, wherein said catalyst employed in said first stage is fresh or regenerated catalyst to obtain maximum 2,2-dimethylbutane and isopentane yields, wherein said catalyst in said final stage, after service as a first stage catalyst, is employed to obtain in said final stage maximum methylcyclopentane yield, the first stage of said isomerization operation being carried out under conditions such that the hydrocarbon fraction is supplied to said first stage at a temperature in the range about 300°–305°F. and recovered from said first stage at a temperature in the range 310°–335°F. and wherein the hydrocarbon fraction undergoing plural stage isomerization is supplied to the last stage of said plural stage isomerization operation at a temperature in the range about 315°–350°F. and recovered from said last stage at a temperature in the range about 340°–370°F., in the aforesaid vapor phase catalytic isomerization operation the hydrocarbon fraction undergoing isomerization being supplied sequentially and serially from the first stage of the plural stage isomerization operation through to the last stage of said isomerization operation.

3,974,062

CONVERSION OF FULL RANGE CRUDE OILS WITH LOW MOLECULAR WEIGHT CARBON-HYDROGEN FRAGMENT CONTRIBUTORS OVER ZEOLITE CATALYSTS

Hartley Owen, Belle Mead; Edward J. Rosinski, Deptford, and Paul B. Venuto, Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 17, 1974, Ser. No. 515,757
Int. Cl.² B01J *8/24*; C01B *29/28*; C10G *11/02*
U.S. Cl. 208—74 **14 Claims**



1. A method for converting a full boiling range oil charge selected from the group consisting of crude oil and syncrudes derived from coal, shale and tar sands which comprises,

mixing the oil charge with at least 5 weight percent on feed of a low molecular weight carbon-hydrogen fragment contributor selected from the group consisting of methanol alone or in admixture with C_2-C_5 olefins,

passing the mixture thus formed in contact with a crystalline zeolite cracking catalyst under conversion conditions comprising a temperature within the range of 800° to 1400°F. and an oil charge residence time within the range of 0.5 to 12 seconds, and

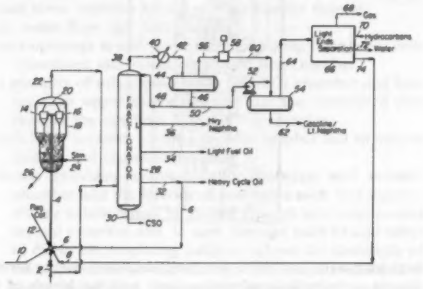
recovering the products of said cracking operation separate from the catalyst employed therein.

3,974,063

DENITROGENATING AND UPGRADING OF HIGH NITROGEN CONTAINING HYDROCARBON STOCKS WITH LOW MOLECULAR WEIGHT CARBON-HYDROGEN FRAGMENT CONTRIBUTORS

Hartley Owen, Belle Mead; Edward J. Rosinski, Deptford, and Paul B. Venuto, Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 17, 1974, Ser. No. 515,778
Int. Cl.² B01J *8/24*; C01B *29/28*; C10G *11/02*
U.S. Cl. 208—120 **8 Claims**



1. A method for converting high nitrogen containing crudes which comprises,

mixing the nitrogen containing crude with a low molecular weight carbon hydrogen fragment contributor selected from the group comprising methanol alone or in admixture with C_2-C_5 olefins,

passing the mixture thus formed in contact with a crystalline zeolite cracking catalyst under conversion conditions comprising a temperature within the range of 800° to 1400°F. and an oil charge residence time within the range of 0.5 to 12 sec. and

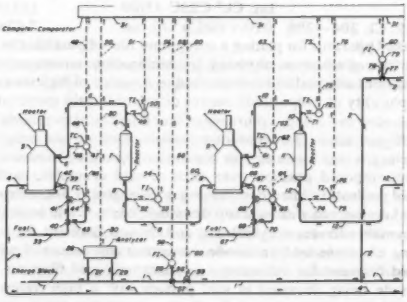
recovering a product of said cracking operation of reduced nitrogen content separate from the catalyst employed.

3,974,064

CONTROL OF HYDROGEN/HYDROCARBON MOLE RATIO AND THE CONTROL SYSTEM THEREFOR

Walter A. Bajek, Lombard, and James H. McLaughlin, La Grange, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Oct. 2, 1974, Ser. No. 511,403
Int. Cl.² C10G *35/04*
U.S. Cl. 208—134 **16 Claims**



1. In a continuous hydrocarbon conversion process wherein (1) a hydrocarbonaceous charge stock is introduced into preheating means having heat-supplying means associated

therewith, (2) the resulting heated charge stock and hydrogen are contacted in a catalytic reaction zone, (3) a hydrogen-containing, hydrocarbon effluent stream is withdrawn from said reaction zone, (4) said effluent stream is condensed and separated to provide a vaporous phase and a liquid phase, (5) at least a first portion of said vaporous phase is recycled at increased pressure, via compressive means, to said reaction zone, and (6) a second portion of said vaporous phase is withdrawn from said conversion process via pressure control, the control system for regulating the hydrogen/hydrocarbon mole ratio of the combined hydrogen-charge stock feed to said reaction zone, which comprises, in cooperative combination:

a. first flow-varying means for adjusting the quantity of heat supplied to said preheating means;
b. second flow-varying means for adjusting the quantity of the second portion of said vaporous phase withdrawn from said conversion process;
c. third flow-varying means for adjusting the flow of compressed vaporous phase recycled from the discharge of said compressive means;
d. a first hydrocarbon analyzer receiving a sample of said hydrocarbonaceous charge stock and developing a first output signal representative of a composition characteristic thereof;
e. a second analyzer receiving a sample of that portion of said vaporous phase recycled to said reaction zone and developing a second output signal representative of the hydrogen concentration thereof;
f. means for sensing the pressure of the separated vaporous phase and developing a third output signal representative thereof;
g. a third hydrocarbon analyzer receiving a sample of said liquid phase and developing a fourth output signal representative of the octane thereof; and,
h. comparator means (i) receiving said first, second, third and fourth output signals, (ii) comparing the actual value of the composition characteristic of said charge stock and the hydrogen concentration of said vaporous phase and (iii) generating fifth, sixth, seventh and eighth output signals;

said control system being further characterized in that said comparator means is in communication with said first, second and third flow-varying means via signal-transmitting means, which transmit said fifth, sixth, seventh and eighth comparator output signals thereto, whereby (i) the quantity of heat supplied to said preheating means, (ii) the quantity of said vaporous phase withdrawn from said process and, (iii) the flow of compressed vaporous phase from the discharge of said compressive means are adjusted in response thereto, and said hydrogen-hydrocarbon mole ratio is regulated.

3,974,065
EARLY DETECTION AND WARNING METHOD FOR CONTROLLING TEMPERATURE EXCURSIONS IN HYDRO-PROCESSING HYDROCARBONS

Bruce E. Powell, Kensington, and Bruce E. Stangeland, Berkeley, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 31, 1974, Ser. No. 537,738
Int. Cl.[2] C10G *13/00, 23/02, 23/10*
U.S. Cl. 208—213 **14 Claims**

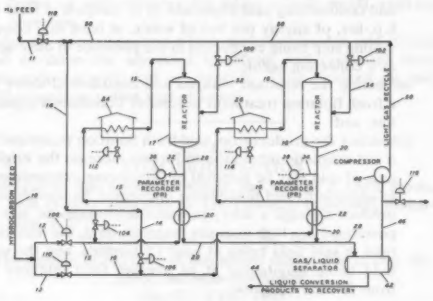
1. A method for detecting a dangerous local temperature excursion in a continuous hydrocarbon hydroprocessing process containing at least one hydroprocessing reactor, said reactor previous to said excursion having been operating under normal hydrocarbon hydroprocessing conditions, including:

a. a hydroprocessable hydrocarbon feed stream introduction into said reactor and into contact with a particulate contact mass contained in said reactor at a suitable feed rate, said reactor being selected from the group consisting of a fixed-bed or fluid-bed reactor;
b. a suitable hydroprocessing temperature and pressure in said reactor; and
c. a reactor effluent product stream comprising a light gas fraction and a liquid hydrocarbon product fraction being withdrawn from said reactor; which comprises:

1. continuously or periodically determining at least one parameter selected from the group consisting of methane content and relative specific gravity of said light gas fraction, said determinations being made during said continuous operation; and
2. comparing a set of said determinations, thereby detecting said excursion when said methane content increases an amount in the range from about 1.3 to 1.8 volume percent units or said relative specific gravity increases an amount in the range from about 0.02 to 0.04 unit.

10. A method for detecting a dangerous local temperature excursion in a continuous hydrocarbon hydrodesulfurizing process employing at least one reactor, said reactor previous to said excursion having been operating under normal hydrocarbon hydrodesulfurizing conditions, including:

a. introducing a hydrodesulfurizable hydrocarbon feed stream selected from the group consisting of crude oil, refinery crude oil fractions, and partially refined crude oil



fractions into said reactor and into contact with a particulate solid composite comprising a solid support or carrier and at least one catalytically active metallic components selected from the group consisting of metals, metal oxides and metal sulfides of Groups VIA and VIII of the periodic chart said introduction of feed being at a liquid hourly space velocity (LHSV) in a range from about 0.1 to 20, and said reactor being a fixed bed or fluid bed reactor;
b. employing a temperature in the range from about 400° to 1100°F and a system pressure in the range from about 1 to 350 atmospheres; and
c. withdrawing a reactor effluent product stream comprising a light gas fraction and a liquid hydrocarbon product fraction from said reactor, which comprises:

1. continuously or periodically determining at least one parameter selected from the group consisting of methane content and relative specific gravity of said light gas fraction, said determinations being made during continuous operation; and
2. comparing a set of said determinations, thereby detecting said excursion where said methane content increases an amount in the range from about 1.3 to 1.8 volume percent units or said relative specific gravity increases an amount in the range from about 0.02 to 0.04 unit.

3,974,066

REMOVAL OF OXYGEN FROM PETROLEUM CHARGE STOCKS

Kenneth M. Brown, Arlington Heights, and Thomas A. Verachtert, Wheeling, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 12, 1975, Ser. No. 586,330
Int. Cl.² C10G 29/04
U.S. Cl. 208—289 12 Claims

1. A method for the removal of oxygen from a petroleum charge stock which comprises treating said petroleum charge stock with an aqueous solution containing a metal phthalocyanine compound and a compound selected from the group consisting of an alkali metal sulfide and an alkali metal sulfite at aqueous treating conditions, and separating said aqueous solution from the resultant oxygen-free petroleum charge stock.

3,974,067

METHOD FOR IMPROVING CLAY BRIGHTNESS UTILIZING MAGNETIC SEPARATION

Alan J. Nott, Tennille, Ga., assignor to Anglo-American Clays Corporation, Sandersville, Ga.

Filed Oct. 8, 1974, Ser. No. 513,154
Int. Cl.² B03B 1/00
U.S. Cl. 209—3 12 Claims

1. A method for brightening a kaolin clay, comprising:

forming an aqueous dispersion of said clay, and blunging and conditioning said dispersion as to dissipate at least 10 h.p.-hrs. of energy per ton of solids, at least said conditioning step being conducted in the presence of oleic acid as a collecting agent;

subjecting the resultant blunged and conditioned slurry to a froth flotation treatment to remove titaniferous impurities; and

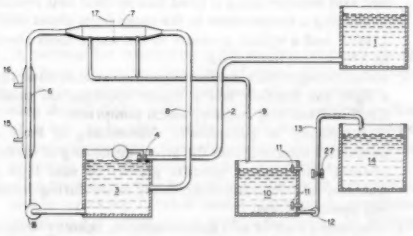
subjecting the product from said froth flotation treatment to a wet magnetic separation to further increase the brightness of said clay be removal of discoloring contaminants in addition to said titaniferous impurities, by passing said product through a slurry-pervious ferromagnetic matrix positioned in a high intensity magnetic field, the retention time in said field being at least 15 seconds, and the said field being maintained at an average field intensity of from 7 to 22 kilogauss.

3,974,068

ULTRAFILTRATION PROCESS AND APPARATUS USING LOW HYDROSTATIC PRESSURE TO PREVENT CONCENTRATION POLARIZATION

Heinrich Ebner, and Anton Enenkel, both of Bonn, Germany, assignors to Firma Heinrich Frings, Bonn, Germany

Continuation-in-part of Ser. No. 202,376, Nov. 26, 1971, abandoned. This application July 18, 1974, Ser. No. 489,778
Int. Cl.² B01D 31/00, 13/00
U.S. Cl. 210—23 F 27 Claims



1. Process for continuous filtration of liquids that contain microorganisms or other finely divided particles to be filtered the steps of,

moving the liquid to be filtered parallel to a flat elongated membrane filter surface with pore diameters between 0.2 and 20 microns and more particularly selected in relation to the particles to be filtered to prevent transport of said particles through the filter,

maintaining flow conditions of laminar flow along the surface and maintaining hydrostatic pressure of no greater than 4.2 psi perpendicular to the filter surface,

adjusting velocity of the moving liquid wherein said velocity is adjusted so that the hydrodynamic pressure $v^2/2g$ created by it and acting parallel to the filter surface is maintained greater than the product of said hydrostatic pressure times the coefficient of sliding friction of said particles on the filter surface times the ratio of the maximum to the minimum crossectional area of said particles so that the force created by hydrodynamic pressure, $v^2/2g$, and acting parallel to the filter surface on the particles exceeds the sliding friction of the particles to counteract concentration polarization tendencies and extend effective filtering time of the process at essentially constant filtration rates compared to running at hydrostatic pressure above 4.2 psi under otherwise identical conditions,

and adding filtering aid particles, whose masses exceed those of the particles to be filtered by at least two factors of ten, to the liquid to be filtered, the filtering aids having a lower cross-sectional area ratio than that of said particles to be filtered and being present in an effective amount to reduce the apparent cross-section area ratio of said particles consistent with maintaining said relation of hydrodynamic pressure forces to friction resistance force and said laminar flow.

3,974,069

PROCESS FOR THE DEHYDRATION OF FATTY SLUDGE AND THE RECOVERY OF CHEMICALS

Per Oscar Nettli, Undelstadveien 33D, 1370 Asker, Norway

Continuation of Ser. No. 496,014, Aug. 7, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,166
Claims priority, application Norway, Jan. 28, 1974, 247/74
Int. Cl.² C02B 1/20
U.S. Cl. 210—45 6 Claims

1. A process for concentrating a precipitated stabilized fatty sludge which has been recovered from a fatty, proteinaceous, aqueous emulsion waste effluent, said stabilized sludge being obtained by adding to the effluent an acid hydrolyzing metal salt in an amount sufficient to bind organic material present into a complex and reducing the pH to below 5, whereafter the formed complex is precipitated, in the presence of alkaline earth ions by raising the pH to 6–9, whereafter the thus formed stabilized sludge is separated, which process consists essentially of the steps of acidifying said stabilized sludge to a pH less than 2, to thereby form a first aqueous phase and a supernatant, concentrated fatty phase which is separated from said first aqueous phase, heating said separated, concentrated fatty phase to form thereby a free fatty acid-containing liquid phase and a second aqueous phase which contains the precipitation chemicals of said stabilized fatty sludge, and separating said free fatty acid-containing liquid phase from said second aqueous phase.

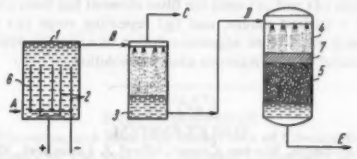
3,974,070
PROCESS FOR PURIFYING TAP WATER

Igor Vasilievich Popov, ulitsa Bljukhera, 59, kv. 41; Gely Romanovich Bochkarev, Krasny prospekt, 56, kv. 26; Vitaly Fedorovich Lebedev, ulitsa Kamenskaya, 88, kv. 8, and Feaor Anisimovich Baryshnikov, ulitsa Derzhavina, 19, kv. 10, all of Novosibirsk, U.S.S.R.

Continuation of Ser. No. 433,700, Jan. 16, 1974, abandoned, which is a continuation of Ser. No. 259,815, June 5, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,265

Int. Cl.[2] B01D *37/02*

U.S. Cl. 210—47 10 Claims



1. A process for purifying tap water consisting of the steps of: adsorbing finely dispersed impurities contained in the water being treated by a flocculating agent consisting of ferric hydroxide, the ferric hydroxide being produced electrolytically with at least one iron anode, said water having a pH of from 7.2 to 8.2, and said ferric hydroxide being deposited as a layer on a layer of a solid water-insoluble granular material having a grain size of from 0.25 to 3 mm and selected from the group consisting of sulphocarbon, anthracite and mixtures thereof; and filtering the water through the layer of ferric hydroxide and the layer of solid water-insoluble granular material at a speed of not more than 3 m/hr.

3,974,071
WATER CONDITIONING DEVICE

Lyman D. Dunn, Chicago, Ill., and John Shields, Terre Haute, Ind., assignors to Marlan Company, Chicago, Ill.

Continuation of Ser. No. 377,553, July 9, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,073

Int. Cl.[2] C23F *13/00*

U.S. Cl. 210—57 4 Claims

1. Method of conditioning a stream consisting essentially of water for removal of ingredients which normally form lime deposits, which method comprises the steps of flowing said water through an elongate container having therein a water erodible corrosion and lime scale inhibitor in the form of spiral rigid strip of copper nickel alloy material formed by twisting a flat strip having machined opposing faces which include highly erodible surfaces caused by plastic elongation of the material during twisting which cause contact of the water with said spiral strip so as to churn the water as it flows through said container, preventing movement of said strip relative to the flowing stream of water, said opposing surfaces being fully within the path of flow within the container and said spiral configuration exposing additional surface per length and creating better contact with all water flowing therethrough compared with a solid non-spiral bar of said alloy, and retaining said strip within said container against ejection by the flow of water.

3,974,072
FILTRATION METHOD

James Derek Birchall; David Cowap, and Joseph Park, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Feb. 25, 1974, Ser. No. 445,781

Claims priority, application United Kingdom, Mar. 2, 1973, 10237/73

Int. Cl.[2] B01D *37/00*

U.S. Cl. 210—65 6 Claims

1. In a metal working operation including a circuit for recirculating a cutting oil emulsion wherein the cutting oil emulsion contains microorganisms, a process for removing the microorganisms from the cutting oil emulsion recirculated in said circuit by filtering, said process comprising the steps of:

providing a filter chamber with an inlet and an outlet,

locating within said chamber intermediate said inlet and said outlet a filter medium comprising fibers of at least one inorganic polycrystalline refractory oxide selected from the group consisting of zirconia, alumina and silica,

introducing used cutting oil emulsion containing microorganisms into the inlet of said chamber for filtering by said filtering medium, and

recirculating the cutting oil emulsion discharged from the outlet of said chamber for reuse in said metal working operation,

whereby microorganisms which were contained in said cutting oil emulsion are separated therefrom and prevented from recombining with said emulsion by being retained on said filter medium within said chamber.

3,974,073
COAL LIQUEFACTION

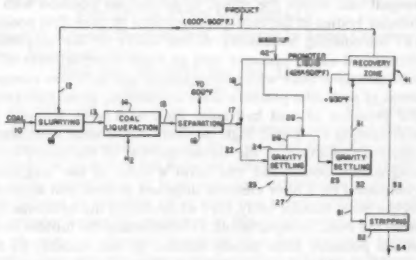
Morgan C. Sze, Upper Montclair, and George J. Snell, Fords, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Sept. 6, 1974, Ser. No. 503,673

The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.

Int. Cl.[2] C10G *1/00*

U.S. Cl. 210—73 R 15 Claims



1. A process for separating insoluble material from a coal liquefaction product produced from a coal feed and comprised of insoluble material and carbonaceous matter dissolved in a coal liquefaction solvent comprising:

introducing the coal liquefaction product into a separation zone containing at least two gravity settlers, with the coal liquefaction product being introduced into the first of the at least two gravity settlers, and overflow from a preceding gravity settler being fed to the next gravity settler and net overflow being recovered from the last of the at least two gravity settlers;

introducing fresh liquid promoter into each of at least two gravity settlers, said liquid promoter having a characterization factor of at least 9.75, a 5 volume percent distillation temperature of at least about 250°F and a 95 volume percent distillation temperature of at least about 350°F and no greater than about 750°F, the fresh liquid promoter being added in a total amount sufficient to recover from the last gravity settler a net overflow essentially free of insoluble material, and recovering from each gravity settler an underflow containing insoluble material.

3,974,074

SEPARATION OF LIQUIDS AND SOLIDS

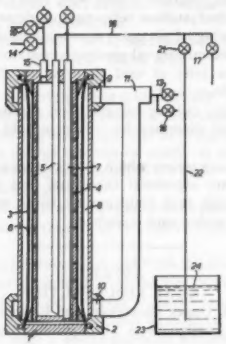
John Anthony Purdey, Par, England, assignor to English Clays Lovering Pochin & Company Limited, Cornwall, England

Filed Apr. 3, 1975, Ser. No. 564,642

Claims priority, application United Kingdom, Apr. 10, 1974, 16037/74

Int. Cl.[2] B01D *23/24*

U.S. Cl. 210—81 4 Claims



1. In a process for reducing the liquid content of a slurry of a particulate magnesium compound which process includes the steps of (i) supporting a tube pressure filter, comprising a pair of generally coaxial inner and outer tubular bodies arranged one within the other, in an upright position with the tubular bodies of the tube pressure filter in their first position; (ii) introducing a quantity of the slurry of the magnesium compound under pressure into an inner compartment of the tube pressure filter whilst introducing into an outer compartment of said tube pressure filter a hydraulic fluid; (iii) raising the pressure of said hydraulic fluid to a high pressure and maintaining it at said high pressure for a time sufficient to effect a reduction in the liquid content of the slurry of the magnesium compound and form a cake of the magnesium compound on a filter element disposed around and supported by the inner tubular body; (iv) withdrawing the hydraulic fluid from the outer compartment; (v) displacing the tubular bodies of the pressure filter axially relative to one another to their second position; (vi) discharging filter cake from the inner compartment; (vii) returning the tubular bodies of the tube pressure filter to their first position, and (viii) repeating steps (ii) to (vii) until the filter element of said tube pressure filter is blinded, the improvement which comprises cleaning said blinded filter element by a method which comprises closing the bottom of the inner tubular body of the tube pressure filter, if it is not already closed, and thereafter carrying out the following steps:

(a) supporting the tube pressure filter in an upright position with the tubular bodies in their first position, (b) filling the interior of the inner tubular body with an aqueous cleaning solution containing a sufficient amount of an ammonium compound which reacts with said solid particles of the magnesium compound to form a substance which is at least partially soluble in the aqueous cleaning solution whilst introducing into the outer compartment of said tube pressure filter a hydraulic fluid, (c) connecting the interior of said inner tubular body to a source of the aqueous cleaning solution, (d) evacuating the hydraulic fluid from the outer compartment of the tube pressure filter thereby drawing the cleaning solution through the filter element, (e) reintroducing hydraulic fluid into the outer compartment of said tube pressure filter thereby forcing the cleaning solution back through the filter element into the interior of inner tubular body, (f) repeating steps (d) and (e) until the filter element has been cleaned to a desired extent, and (g) repeating steps (b) to (f) using water or an aqueous solution of a soap or detergent instead of said aqueous cleaning solution.

3,974,075

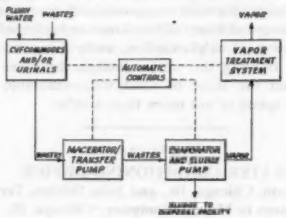
TOILET SYSTEM

Philip A. Saigh, Morton Grove; Albert J. Glueckert, Skokie; Pranas Budininkas, Cicero, and Joseph Caldwell, Jr., Lombard, all of Ill., assignors to General American Transportation Corporation, Chicago, Ill.

Filed July 3, 1975, Ser. No. 593,119

Int. Cl.[2] C02C *1/00*

U.S. Cl. 210—86 17 Claims



1. A toilet system which comprises:

an evaporator tank having an inlet, to receive flushed waste from a toilet or a urinal, and an outlet that is at the top portion of said evaporator tank;

first heater means including a first heater mounted on said evaporator tank;

a vapor treatment system including a vessel having an inlet and a vent outlet and containing a bed of oxidation catalyst capable of oxidizing at an elevated temperature compounds evaporated with water evaporated from flushed waste;

first conduit means connected to said outlet of said evaporator tank and said inlet of said vessel to transfer vapor from said evaporator tank to said vessel;

second conduit means connected to said first conduit means to introduce pressurized air into the vapor between said evaporator tank and said vessel for admixture of said air with said vapor;

second heater means including a second heater mounted on one of said first and second conduit means to provide to said vessel of said vapor treatment system the admixture of said vapor and said air at an elevated temperature sufficiently high for said oxidation catalyst to provide said air oxidation of said compounds vaporized with water from said evaporator tank;

high-level sensing means, mounted in said evaporator tank, that is operative, when the level of liquid waste in said evaporator tank has raised to a predetermined high level;

means responsive to a substantial decrease in the rate of heat transfer from said first heater means to liquid waste in said evaporator tank due to increased solids content of liquid waste in said tank as a result of the evaporation of water vapor from said tank; and

means operative by the concurrent operation of said high-level sensing means and of said responsive means to provide a signal indicating that the level of liquid waste in said evaporator tank is at the predetermined higher level and the rate of heat transfer from said first heater means to said liquid waste has substantially decreased.

3,974,076

FABRIC SOFTENER

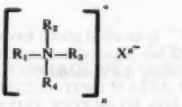
Ype Wiersema, and Ross Dale Ricke, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 11, 1974, Ser. No. 432,784
Int. Cl.[2] D06M *13/46*
U.S. Cl. 252—8.8 7 Claims

1. A fabric softener composition, comprising:

a. a conditioning amount of dispersed water-insoluble softener component particles having a size such that about 40% to about 50% of the particles pass through a filter having an average pore diameter of about 0.5 microns, said particles comprising a mixture of

i. from about 2 parts to about 10 parts by weight of a substantially water-insoluble quaternary ammonium compound of the formula

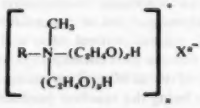


wherein R_1 and R_2 are each hydrocarbyl groups containing from about 1 to about 25 carbon atoms, the sum of R_1 and R_2 being at least 22 carbon atoms, R_3 and R_4 are each hydrocarbyl groups containing from about 1 to about 6 carbon atoms, X is an anion and *n* is an integer from 1 to about 3;

ii. from about 0.1 part to about 2 parts by weight of a substantially water-insoluble straight chain alcohol containing from about 8 to about 20 carbon atoms, the weight ratio of said quaternary compound to said alcohol being in the range of from about 100:1 to about 3:1;

b. from about 0.1% to about 2.0% by weight of a nonionic surfactant containing a lipophilic hydrocarbyl group of from about 6 to about 20 equivalent carbon atoms and from about 5 to about 15 ethylene oxide moieties;

c. from about 0.1% to about 3% by weight of a water-soluble ethoxylated quaternary ammonium compound of the formula



wherein R is a substantially straight chain alkyl group of from about 14 to about 20 carbon atoms; *x* and *y* are each integers of from 1 to 5, the sum of $x + y$ being from about 2 to about 6; X is an anion and *n* is an integer from 1 to 3; and

d. the balance comprising a water-soluble liquid carrier.

3,974,077

FRACTURING SUBTERRANEAN FORMATION

Dustin L. Free, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 19, 1974, Ser. No. 507,520
Int. Cl.[2] E21B *43/26*
U.S. Cl. 252—8.55 R 11 Claims

1. A method of fracturing a subterranean formation penetrated by a borehole which comprises:

a. providing a flowing stream of an aqueous fluid;

b. providing a compound in said fluid for releasing borate ions into said fluid prior to or substantially concurrently with injection of the components recited in clause (c);

c. substantially continuously formulating a fracturing fluid by substantially continuously injecting into the flowing aqueous stream:

1. a galactomannan gum,

2. a buffer which produces an initial acidic pH in the fluid, and

3. a delayed action basic compound to neutralize said buffer and produce a basic pH in said fluid after a period of time sufficient both to permit introduction of said fluid into the borehole while still at an acidic pH to permit said gum to hydrate, yet within a time period such that said hydrated gum is crosslinked with said borate ion prior to reaching said formation,

the amounts of said borate ion, gum, buffer, and basic compound employed being sufficient to form a fracturing fluid;

d. substantially as said fracturing fluid is formulated and while the *p*H of the fluid is still acidic, introducing a quantity of said fracturing fluid into the borehole sufficient for fracturing the formation;

e. permitting the pH of the introduced fluid to change from acidic to basic before said introduced fluid is brought into contact with the formation, thereby effecting borate crosslinking of the gum; and

f. contacting the formation with said fluid containing crosslinked gum, under sufficient pressure to fracture the formation.

3,974,078

ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS

Richard G. Crystal, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1971, Ser. No. 214,481
Int. Cl.[2] G03G *9/00*
U.S. Cl. 252—62.1 P 11 Claims

1. An electrostatographic toner comprising dry particulate toner particles comprising a colorant selected from the group consisting of pigments and dyes, an electrophotographic resin, said resin comprising at least one soft deformable polymer encapsulated in a matrix of at least one tough polymer, said soft polymer being encapsulated in the tough polymer matrix in a plurality of discrete domains, said soft polymer being selected from the group consisting of alkyl acrylate polymers in which the alkyl group has from 1–12 carbon atoms, alkylmethacrylate polymers in which the alkyl group has from 4–12 carbon atoms, siloxane polymers, lactone polymers, vinyl acetate polymers, alkylene oxide polymers, and unsaturated diene polymers, and said tough polymer being selected from the group consisting of styrene polymers including polystyrene, poly halo styrene, poly alkyl styrenes, styrene-n-butylmethacrylate copolymers; polymers of alkyl-methacrylates wherein the alkyl group has from 1–3 carbon atoms; polymers of acrylonitrile; polymers of vinyl halides, including vinyl chloride polymers; polyamides, polyesters, polymers of acrylic acids; polymers of methacrylic acids, polymers of vinyl-N-alkyl pyridene; and poly carbonates.

3,974,079
PRODUCTION OF GAMMA IRON OXIDE

Peter Woditsch; Kurt Hill, both of Krefeld; Franz Hund, Krefeld-Bockum, and Fritz Rodi, Kaldenhausen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 249,547, May 2, 1972, abandoned. This application Nov. 2, 1973, Ser. No. 412,488
Claims priority, application Germany, May 6, 1971, 2122312
Int. Cl.² C01G *49/06*
U.S. Cl. 252—62.56 **9 Claims**

1. In the process of producing ferromagnetic iron oxides by the steps comprising oxidizing a solution of a ferrous salt in the presence of α-FeO(OH) seed and a basic precipitant which acts as a proton acceptor thereby to form α-FeO(OH) pigment, dehydrating said α-FeO(OH) pigment to α-Fe_2O_3, reducing said α-Fe_2O_3 to Fe_3O_4 and re-oxidizing said Fe_3O_4 to γ-Fe_2O_3 having a needle length-to-width ratio of from 2:1 to 20:1, the improvement which comprises adding to said solution at the beginning of or during pigment formation phosphoric acid or a water soluble salt thereof in an amount, calculated as P_2O_5, of about 0.1 to 4% by weight of the α-FeO(OH) pigment produced, whereby the γ-Fe_2O_3 ultimately produced is of high coercive force.

3,974,080
SILICONE HYDRAULIC FLUIDS

Robert Lee Coffman, Mahopac, and Richard Welty Shiffler, Briarcliff Manor, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,703
Int. Cl.² C10M *3/44*; C09N *3/00*
U.S. Cl. 252—78.3 **12 Claims**

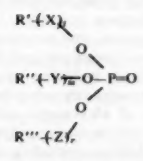
1. Hydraulic fluid composition having excellent water tolerance at −40°C. which comprises:

A. about 50 to 99% by weight of an alkoxy-siloxane having the formula:

$$RO[(CH_3)_2SiO]_nR$$

wherein R is a monovalent hydrocarbon group or a mixture of monovalent hydrocarbon groups derived from an aliphatic alcohol or a mixture of aliphatic alcohols respectively, having the formula ROH, by removal of the hydroxyl group, said alcohol or mixture of alcohols having a boiling point above about 78°C. at atmospheric pressure, and n is an integer having values of about 5 to about 200; and

B. about 1 to about 50% by weight of a phosphoric acid ester having the formula:



wherein each of R′, R″ and R‴ is a lower alkyl group having 1 to 4 carbon atoms, X, Y and Z are oxyalkylene units, including mixed oxyalkylene units having the formula:

wherein t, m and r are integers having values of 1 to 6 and p is an integer havng values of 2 to 3.

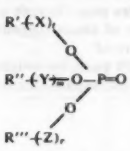
12. A process for transmitting force in a hydraulic brake system of a vehicle having activating means, activated means, master brake cylinder means, and hydraulic line means connecting said activating means, said activated means and said master brake cylinder means, comprising applying mechanical force to said activating means, wherein said activating means, said activated means, said master brake cylinder means and said hydraulic line means are substantially filled with an hydraulic fluid composition which comprises:

A. about 50 to about 99% weight of an alkoxysiloxane having the formula:

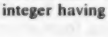
$$RO[(CH_3)_2SiO]_nR$$

wherein R is a monovalent hydrocarbon group or a mixture of monovalent hydrocarbon groups derived from an aliphatic alcohol or a mixture of aliphatic alcohols, respectively, having the formula ROH, by removal of the hydroxyl group, said alcohol or mixture of alcohols having a boiling point above about 78°C. at atmospheric pressure, and n is an integer having values of about 5 to about 200; and

B. about 1 to about 50% by weight of a phosphoric acid ester having the formula:



wherein each of R′,R″ and R‴ is an alkyl group having 1 to 4 carbon atoms and X, Y and Z are oxyalkylene units, including mixed oxyalkylene units having the formula:



wherein t, m and r are integers having values of 2 to 4 and p is an integer having values of 2 to 3.

3,974,081
BIODEGRADABLE SEAL SWELL ADDITIVE WITH LOW TOXICITY PROPERTIES FOR AUTOMATIC TRANSMISSION FLUIDS, POWER TRANSMISSION FLUIDS AND ROTARY ENGINE OIL APPLICATIONS

Alfred J. Rutkowski, Colonia, and John P. Szykowski, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 31, 1974, Ser. No. 493,243
Int. Cl.² C10M *1/26*; C09K *3/00*
U.S. Cl. 252—79 **10 Claims**

1. In a method of operating a vehicular automatic transmission having rubber seals subject to deterioration and leakage, the improvement of using an automatic transmission fluid comprising about 70 to 95 volume percent of mineral lubricating oil, and about 0.1 to 5 volume percent of a seal swell additive which is 70 to 100 volume percent of an oil soluble, aromatic hydrocarbon ester of 10 to 60 carbon atoms and 2 to 3 ester linkages, said ester being the reaction product of an aliphatic alcohol having from 1 to 13 carbon atoms and an aromatic polycarboxylic acid having 2 to 3 carboxylic acid groups, said ester having the property of swelling said seals to thereby prevent leakage.

7. In a method according to claim 1, wherein said seal swell additive includes within the range of 30 to 0 volume percent of an aliphatic alcohol of from 8 to 13 carbon atoms which

cooperatively with said ester imparts to said fluid the seal swelling property.

3,974,082

BLEACHING COMPOSITIONS

Hendrik Frans Weyn, Le Chesnay, France, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 282,367, Aug. 21, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,071

Int. Cl.² C11D 3/395, 7/54

U.S. Cl. 252—95 7 Claims

4. A bleaching composition consisting essentially of an oxygen-releasing inorganic percompound, an acyl-alkyl ester having the formula R_1COOR_2 wherein R_1 is an alkyl group of 1 to 7 carbon atoms and R_2 is an alkyl group of 1 to 10 carbon atoms and an esterase or lipase enzyme capable of hydrolyzing said ester, said composition being effective for bleaching at temperatures of 25°C. and above, wherein said percompound is present in an amount of about 1% to about 40% by weight of the total composition, and wherein the ratio of said percompound to said ester is about 1 to 6 to about 6 to 1 and the ratio of said ester to said enzyme is about 30 to 1 to about 5 to 1.

3,974,083

CONTROL OF CORROSION AND SCALE IN CIRCULATING WATER SYSTEMS BY MEANS OF PARTIAL ESTERS OF POLYFUNCTIONAL ORGANIC ACIDS

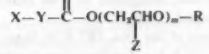
Tzeng Jiueq Suen, New Canaan; Arthur James Begala, Jr., Fairfield, and Martin Grayson, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 29, 1974, Ser. No. 456,119

Int. Cl.² C02B 1/00, 5/00

U.S. Cl. 252—180 10 Claims

1. A process of inhibiting corrosion and scale on ferrous metal surfaces in a circulating water system comprising the addition to circulating water in said system of from 10 to 500 parts per million parts water of additive selected from compounds having the formula



wherein:

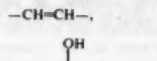
R is a hydrocarbon radical having 8 to 20 carbon atoms selected from alkyl, alkenyl, cycloalkyl and arylalkyl;

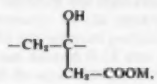
m is a value from 1 to 5;

Z is hydrogen or methyl;

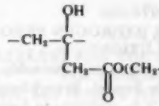
Y is selected from alkylene or arylene having 2 to 8 carbon atoms,

wherein W is hydrogen or hydroxy,





and



wherein

m and Z are as defined before, and

M is a member selected from the group consisting of hydrogen, ammonium, alkylammonium, polyalkylammonium, alkali metal, and alkaline earth metal; and

X is a member selected from the group consisting of COOM, $PO(OM)_2$ and SO_3M wherein M is as defined before.

3,974,084

PROCESS FOR THE MANUFACTURE OF ANHYDROUS ALKALI METAL ARYLATE SOLUTIONS AND SEPARATION OF THE ARYLATES FROM ALKALI METAL SULFITE

Siegfried Pietzsch, Kelkheim, Taunus, and Georg Schaeffer, Hofheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 9, 1973, Ser. No. 377,231

Claims priority, application Germany, July 11, 1972, 2233940

Int. Cl.² C07C 39/00, 37/22, 37/24

U.S. Cl. 252—182 7 Claims

1. A process for the manufacture of an anhydrous ketonic solution of an alkali metal arylate free from alkali metal sulfite which comprises, at a temperature in the range of about 15° to about 200°C.: dissolving (A) a melt product containing (1) an alkali metal arylate wherein said arylate is phenolate, naphtholate, phenolate substituted on the aromatic nucleus by at least one methyl, ethyl, phenyl or chlorine, naphtholate substituted on the aromatic nucleus by at least one methyl, ethyl, phenyl or chlorine, or mixtures thereof, (2) an alkali metal hydroxide and (3) an alkali metal sulfite in (B) a ketone that is immiscible with water or that is miscible with at most about 15% of water at room temperature, said ketone having up to 17 carbon atoms and being an araliphatic ketone, an aromatic ketone, a cyclic ketone, an aliphatic ketone, or a mixture thereof; removing undissolved alkali metal sulfite from the ketonic solution; and thereafter removing any water from the ketonic solution by azeotropic distillation thereof.

3,974,085

PROCESS FOR LIQUID PHASE PURIFICATION OF CARBIDE ACETYLENE AND COMPOSITIONS THEREFOR

Dmitry Vladimirovich Sokolsky, prospekt Abaya, 31, kv. 38; Yakov Avraamovich Dorfman, 7 mikroraion, 4, kv. 24, and Irina Anatolievna Kazantseva, ulitsa Minusinskaya, 20b, kv. 12, all of Alma-Ata, U.S.S.R.

Filed Mar. 13, 1972, Ser. No. 234,394

Int. Cl.² C09K 3/00

U.S. Cl. 252—186 1 Claim

1. A highly active oxidative aqueous solution for acetylene purification which removes hydrogen phosphide and hydrogen sulfide admixture from said acetylene, said solution consisting of 100 to 200 parts by weight of cupric chloride, 10^{-2} to 10^{-2} part by weight of mercuric chloride and 200 to 300 parts by weight of hydrochloric acid, said hydrochloric acid

being replaceable by sodium chloride, in amounts from 180–30 parts by weight and water in from 500 to 700 parts by weight.

3,974,086

STABILIZATION OF HYDROGEN PEROXIDE SOLUTIONS

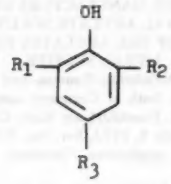
Michael McKay Rauhut, Bridgewater Township, Somerville County, and Andrew Milo Semsel, Branchburg Township, Somerset County, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 250,221, May 4, 1972, abandoned. This application May 10, 1974, Ser. No. 468,843

Int. Cl.² C09K *11/06*

U.S. Cl. 252—188.3 CL **2 Claims**

1. A stabilized component in a chemiluminescent light system said component comprising a solution in organic solvent of a bis-ester of oxalic acid, an organic fluorescent compound and a stabilizing amount of a phenolic antioxidant compound of the formula



wherein each of R_1 and R_2 is tertiary alkyl having 4 to 12 carbon atoms and R_3 is alkyl having 1 to 12 carbon atoms.

3,974,087

LIQUID CRYSTAL COMPOSITIONS

George William Gray, Cottingham; Kenneth John Harrison, Hull; David Sanderson Hulme, Hooton, and Edward Peter Raynes, Lower Wick, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

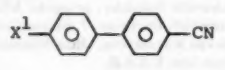
Filed Mar. 15, 1974, Ser. No. 451,547

Claims priority, application United Kingdom, Oct. 17, 1973, 48468/73

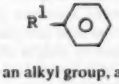
Int. Cl.² C09K *3/34*; G02F *1/13*

U.S. Cl. 252—299 **15 Claims**

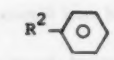
1. A liquid crystal material consisting of an eutectic mixture of at least three compounds having the formula



wherein x^1 is selected from the group consisting of an alkyl group, an alkoxy group, a substituted phenyl group



wherein R^1 represents an alkyl group, and a substituted phenyl group



where R^2 represents an alkoxy group, the total number of carbon atoms in the alkyl or alkoxy moieties of X^1 ranging from 3 to 9.

3,974,088

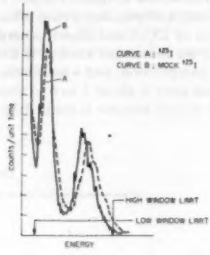
MOCK IODINE-125 RADIATION SOURCE

David L. Coffey, Oak Ridge, Tenn., assignor to The Nucleus, Inc., Oak Ridge, Tenn.

Filed Sept. 19, 1974, Ser. No. 507,460

Int. Cl.² C09K *3/00*

U.S. Cl. 252—301.1 R **7 Claims**



1. A mock iodine-125 radiation source which comprises a combination of radionuclides comprising iodine-129 and americium-241, disposed in a radiation-transparent enclosure, whose combined emissions give rise to an energy spectrum measured in a well-type detector that substantially simulates the corresponding energy spectrum of iodine-125.

3,974,089

PROCESS FOR PREVENTING SEGREGATION OF A COMPONENT IN A MIXTURE OF POWDERS

James E. Owen, Mount Holly, N.C., and J. William Vogt, South Russell, Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 287,578, Sept. 19, 1972, Pat. No. 3,838,064, which is a continuation-in-part of Ser. No. 136,267, April 21, 1971, abandoned. This application Sept. 20, 1974, Ser. No. 507,917

The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.

Int. Cl.² C09K *3/22*

U.S. Cl. 252—384 **8 Claims**

1. A process for substantially negating the segregation of particles of a finely divided powder in bulk, including mixing the powder with a sufficient amount of a fibrillatable polytetrafluoroethylene resin to form a random network of fibers, and working the mixture at a temperature above 20° C. but below the decomposition temperature of the resin or of the finely divided powder, whichever is lower, until a random network of fibers of said polytetrafluoroethylene resin is formed which loosely confines the particles of the powder.

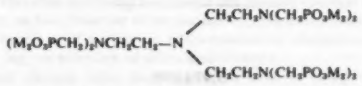
3,974,090

IMINO ALKYLIMINO PHOSPHONATES AND METHOD FOR PREPARING AND USING SAME

Robert S. Mitchell, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 20, 1975, Ser. No. 560,078
Int. Cl.² C09K 15/18
U.S. Cl. 252—389 A 30 Claims

12. A method of inhibiting the precipitation of scale-forming salts in an aqueous system comprising adding to said system at least a precipitation inhibiting amount of a nitrilo tris[ethylimino bis(methyl phosphonic acid)] compound having the general formula



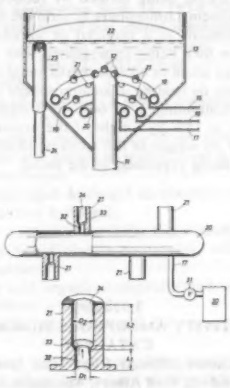
wherein M is selected from the group consisting of hydrogen, alkali metal ions, ammonium ions, alkylammonium ions and mixtures of hydrogen and at least one other of said ions.

3,974,091

FLUIDIZED BED REGENERATION OF CARBON-CONTAMINATED CATALYSTS USING GAS DISCHARGE NOZZLES OF SPECIFIC DIMENSIONS

Wesley A. Parker; John E. Gwyn, and Glenn R. McCullough, all of Pasadena, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 501,514, Aug. 29, 1974, abandoned. This application May 2, 1975, Ser. No. 574,188
Int. Cl.² B01J 21/20, 29/38, 8/24; C10G 11/18
U.S. Cl. 252—417 3 Claims



1. In a process for fluidized bed regeneration of carbon-contaminated catalysts wherein at least a portion of the oxygen-containing gas required for fluidization and burn-off of carbon deposited on the catalyst particles is introduced as a separate stream into the dense phase of the fluidized catalyst bed contained in a regeneration chamber by means of a plurality of gas discharge nozzles connected to an external source of pressurized oxygen-containing gas by one or more horizontally disposed manifold members; the improvement which comprises, introducing the oxygen-containing gas at a nozzle outlet velocity in the range of about 75 to about 125 ft/sec via gas discharge nozzles which are substantially cylindrical in shape having an upstream portion and a downstream portion with a transition portion connecting the upstream and downstream portions and wherein said upstream portion is attached to said manifold member which discharge nozzles are restricted in internal cross-sectional area in their upstream portions and expanded in the internal cross-sectional area of their downstream portions such that (a) the numerical ratio of the difference between the diameter of the downstream portion and the diameter of the upstream portion divided by the length of the downstream portion taken in the direction of gas flow does not exceed 0.18 and (b) the ratio of the internal diameter of the upstream portion to its length taken in direction of gas flow does not exceed 1.67.

3,974,092

CATALYST FOR THE PREPARATION OF POLYALKENAMERS

Roland Streck, and Heinrich Weber, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Division of Ser. No. 150,193, June 4, 1971, Pat. No. 3,804,803. This application Jan. 7, 1974, Ser. No. 431,371
Claims priority, application Germany, June 6, 1970, 2027905
Int. Cl.² C08F 4/22
U.S. Cl. 252—429 B 10 Claims

1. In a catalyst system for the ring-opening polymerization of cyclic olefins consisting essentially of: (1) a tungsten or molybdenum compound; (2) an organoaluminum compound; and (3) a compound containing one or more hydroxyl or sulfhydryl groups; the improvement of (4) an ether of vinyl alcohol, allyl alcohol or 2-butene-1,4 diol, the molar ratio of component (1) to component (2) being less than 1 : 1, the molar ratio of component (1) to component (3) being about 1 : 0 to 1 : 2 and the molar ratio of component (1) to component (4) being less than 100 : 1.

3,974,093

TWO-COMPONENT CATALYST FOR THE PRODUCTION OF SIDE CHAIN HALOGEN SUBSTITUTION PRODUCTS OF AROMATIC COMPOUNDS

Mike Mehdi Fooladi, Apt. 4-B, Oakmont Manor Apartments, Vicksburg, Miss. 39180

Filed Sept. 6, 1974, Ser. No. 503,981
Int. Cl.² B01J 31/02
U.S. Cl. 252—429 R 3 Claims

1. A chlorination catalyst for chlorination of alkyl aromatic side chains consisting essentially of about 3 to 20 parts by weight of phosphorus trichloride and 0.2 to 10 parts by weight of bis (dimethyl thio carbamoyl) disulfide.

3,974,094

CATALYST SYSTEM FOR THE PRODUCTION OF POLYALKENAMERS

Roland Streck, and Heinrich Weber, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Continuation-in-part of Ser. No. 388,145, Aug. 14, 1973, abandoned, which is a division of Ser. No. 152,373, June 11, 1971, Pat. No. 3,816,384. This application Nov. 13, 1974, Ser. No. 523,548
Claims priority, application Germany, June 11, 1970, 2028716
Int. Cl.² C08F 4/22; B01J 31/14
U.S. Cl. 252—429 B 11 Claims

1. In a catalyst system suitable for the ring-opening polymerization of cyclic olefins comprising (a) a salt of tungsten or of molybdenum and (b) an organoaluminum compound, the improvement wherein said catalyst system consists essentially of said components (a) and (b) in a molar ratio (a):(b) of less than 1:1 and (c) of vinylic halide halogenated hydrocarbon wherein one of the double bonded carbon atoms is substituted by one chlorine, bromine or iodine atom and at least one of the double bonded carbon atoms bears a hydrogen atom, the molar ratio of (a) to (c) being less than 100:1.

3,974,095

CATALYST FOR HYDROGENATION, ISOMERIZATION AND HYDROSILYLATION OF ALKANES, AND METHOD OF PREPARATION

Mark Afimovič Volpin, Moscow, U.S.S.R.; Jiří Hetflejš, Prague, Czechoslovakia; Igor Sergeevič Kolomnikov, Moscow, U.S.S.R.; Petr Svoboda, Prague, Czechoslovakia; Vladimir Alexandrovič Sergeev, Moscow, U.S.S.R., and Valentin Kuzmič Sitikov, Moscow, U.S.S.R., assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia and Akademie Nauk SSSR, Moscow, U.S.S.R.

Filed Dec. 19, 1974, Ser. No. 534,440

Claims priority, application Czechoslovakia, Dec. 20, 1973, 8856-73

Int. Cl.² B01J *31/02*

U.S. Cl. 252—429 R **6 Claims**

1. A catalyst for hydrogenation, isomerization and hydrolization of alkenes having from 2–16 atoms of carbon, said catalyst comprising a transition metal selected from the group consisting of palladium, platinum, rhodium and ruthenium complexed with polyphenylene having a molecular weight in excess of 1000, said metal being present in an amount ranging from 0.5 – 20 percent, by weight, based upon the weight of the catalyst.

3,974,096

WATER GAS SHIFT CATALYST

Marnell A. Segura; Clyde L. Aldridge; Kenneth L. Riley, and Lloyd A. Pine, all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 235,178, March 16, 1972, abandoned. This application Nov. 22, 1974, Ser. No. 526,306

Int. Cl.² B01J *27/04, 27/10*

U.S. Cl. 252—439 **6 Claims**

1. An improved catalyst composition comprising, in combination, a support material containing (i) alkali metal sulfide, alkali metal bisulfide, alkali metal hydroxide or salt of an alkali metal derived from an acid having an ionization constant less than 1×10^{-3}, (ii) a hydrogenation-dehydrogenation component selected from the group consisting of (a) a non-noble metal composition comprising an oxide or a sulfide of vanadium, molybdenum, tungsten, cobalt, tantalum or niobium or mixtures thereof of (b) mixtures of non-noble metal materials comprising an oxide or a sulfide of vanadium, molybdenum, tungsten, cobalt, tantalum or niobium or mixtures thereof with an oxide or a sulfide of nickel, iron or chromium or mixtures thereof, and (iii) a halogen moiety, the weight ratio of said hydrogenation-dehydrogenation component to said alkali metal sulfide, bisulfide, hydroxide or salt, each calculated on the basis of the oxide thereof, being less than about 10:1.

3,974,097

CATALYSTS FOR THE HYDRO-TREATMENT OF HYDROCARBONS AND PROCESS OF PREPARING SUCH CATALYSTS

Joseph Edouard Weisang, and Philippe Engelhard, both of Le Havre, France, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed Nov. 20, 1974, Ser. No. 525,675

Claims priority, application France, Nov. 23, 1973, 73.41827

Int. Cl.² B01J *23/62;* **C10G** *35/08*

U.S. Cl. 252—440 **7 Claims**

1. In a process for manufacturing a hydro-treatment catalyst having a porous refractory inorganic oxide support with a specific surface between 15 and 350m²/g, with a specific pore volume greater than 0.1cm³/g and with at least a slightly acid character, incorporating onto said support a halogen in combined form between 0.4 and 2% and the following metals:

a. about 0.02 to 2% of at least one platinum metal,

b. about 0.02 to 2% of at least a second metal;

c. about 0.02 to 2% of tin,

said weight percentages being based on the total weight of the catalyst,

and comprising at least one impregnation of the support by at least one solution containing at least one of said second metal, a platinum metal, and tin,

the improvement wherein said second metal is titanium and the incorporation of said metals onto said support comprises at least one of the impregnation solutions contains either cations or anions containing titanium.

3,974,098

CATALYSTS OF NICKEL AND URANIUM

Derek Gabriel Gavin, Sheffield, England, assignor to Price-Pearson Refractories Limited and British Gas Corporation, both of Sheffield, England

Filed Feb. 20, 1974, Ser. No. 444,002

Claims priority, application United Kingdom, Feb. 27, 1973, 9755/73

Int. Cl.² B01J *27/20*

U.S. Cl. 252—443 **13 Claims**

1. A method of producing a catalyst consisting essentially of impregnating shaped carriers of refractory material with a solution of the salts of a nickel metal constituent and a uranium constituent, the shaped carriers being fired to decompose the salts to form a mixture of the oxide of the nickel constituent and a compound or solid solution of the oxides of the nickel metal and uranium constituents, the nickel component of the catalyst being formed by reduction of the said mixture in a reducing atmosphere to form the nickel metal and uranium constituent in a reduced or unreduced state, the shaped carriers then being impregnated with a water soluble compound of an alkali or alkaline earth metal and finally fixed as the carbonate by heating in an atmosphere containing CO_2, said catalyst containing 2 to 60% by weight of the nickel constituent, 5 to 15% by weight of the uranium component, and up to 43% by weight of the alkali or alkaline earth metal, said amounts being expressed as the metal.

3,974,099

HIGH ACTIVITY AMORPHOUS SILICA-ALUMINA CATALYST

Roger Jean Lussier, Ellicott City; John Storey Magee, Jr., Cooksville; Edwin Wolf Albers, Annapolis, and George John Surland, Woodbine, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,579

Int. Cl.² B01J *37/02, 29/06*

U.S. Cl. 252—453 **6 Claims**

1. A process of preparing a high amorphous hydrocarbon cracking catalyst which comprises:

a. mixing solutions of a soluble aluminum compound and sodium silicate in a weight ratio of Al_2O_3 to SiO_2 from 0.64 to 1 to 5.7 to 1

b. aging the resulting gel,

c. adjusting the pH of the gel to a pH of 5.0 to 10.0 to precipitate excess alumina,

d. drying the resulting composite,

e. grinding and exchanging with an ammonium sulfate solution to reduce the Na_2O content to less than 1 percent, and,

f. washing, drying and recovering the product.

3,974,100

STEAM-ACTIVATED OLEFIN DISPROPORTIONATION CATALYSTS

Donald H. Kubicek, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 354,550, April 26, 1973, Pat. No. 3,888,940. This application Jan. 20, 1975, Ser. No. 542,271

Int. Cl.² B01J *29/36, 21/04, 21/08, 23/28*

U.S. Cl. 252—455 R **19 Claims**

1. A method for activating a supported molybdenum oxide or rhenium oxide catalyst composition which comprises treating said supported composition under thermal activation conditions at elevated temperatures with water or water vapor, and therefter calcining said thermally treated catalyst composition in the presence of molecular oxygen-containing gases,

wherein said support is silica-containing alumina-containing, or mixtures of silica and alumina,

and wherein when said supported catalyst composition is said supported molybdenum oxide, said molybdenum oxide catalyst composition further can contain a cobalt component in the range of up to 20 weight percent expressed as CoO relative to the weight of the total catalyst, and

wherein said thermal activation conditions at elevated temperatures with water or water vapor are conducted at elevated temperatures of at least about 700° F. in the substantial absence of molecular oxygen-containing gases.

3,974,101

OLEFIN POLYMERIZATION CATALYST

Donald R. Witt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 79,316, Oct. 8, 1970, Pat. No. 3,900,457. This application Sept. 16, 1974, Ser. No. 505,997

The portion of the term of this patent subsequent to Aug. 19, 1992, has been disclaimed.

Int. Cl.² B01J *29/00*

U.S. Cl. 252—458 **9 Claims**

1. A method of preparing a silica-containing composition comprising:

a. adding an alkali metal silicate to an acid selected from sulfuric acid and carbonic acid to form a hydrogel;

b. aging the hydrogel;

c. washing the aged hydrogel to produce a substantially alkali metal-free hydrogel;

d. forming a mixture comprising the washed hydrogel and a normally liquid oxygen-containing, water-soluble organic compound;

e. separating said organic compound and water from said mixture to form a xerogel;

f. recovering said xerogel as said silica-containing composition, and

g. impregnating said silica-containing xerogel composition with a chromium compound convertible to chromium oxide.

3,974,102

MIXED METAL CATALYST FOR ISOMERIZATION OF ALPHA-PINENE TO BETA-PINENE

Gregory L. Kaiser, West Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.

Filed May 12, 1975, Ser. No. 576,744

Int. Cl.² B01J *21/04, 23/58, 23/72, 23/78*

U.S. Cl. 252—466 J **9 Claims**

1. A process for neutralizing the acidic functionality displayed by an alumina-supported Group VIII catalyst admixed with Group IB metal, wherein said Group VIII catalyst and said Group IB metal are disposed on said alumina support by contacting said alumina support with a Group VIII and Group IB salt solution followed by drying and reduction, said reduced alumina-supported Group VIII catalyst and Group IB metal having residual anions remaining thereon, said Group VIII catalyst being an elemental Group VIII metal having an atomic number between 28 and 78, inclusive, and said anions forming acid when contacted by hydrogen, which comprises:

a. treating said alumina-supported catalyst and Group IB metal with at least about 0.002 weight parts per weight part of said alumina support of an alkali metal or alkaline earth metal provided from a salt or hydroxide of an alkali metal or alkaline earth metal salt or hydroxide inert to said catalyst, said treatment resulting in the formation of a salt of an alkali metal or alkaline earth metal with said residual anions; and

b. heating said treated alumina-supported catalyst and Group IB metal in the presence of hydrogen at a temperature less than about the minimum sintering temperature of said catalyst, the temperature of said heating being sufficient to volatilize or decompose the compound formed by the anion of said salt or hydroxide and said hydrogen.

3,974,103

CATALYST FOR ISOMERIZATION OF ALPHA-PINENE TO BETA-PINENE

Gregory L. Kaiser, West Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.

Filed May 12, 1975, Ser. No. 576,718

Int. Cl.² B01J *21/04, 23/58, 23/78*

U.S. Cl. 252—466 J **12 Claims**

1. A process for neutralizing the acidic functionality displayed by an alumina-supported Group VIII catalyst, wherein said Group VIII catalyst is disposed on said alumina support by contacting said alumina support with a Group VIII salt solution followed by drying and reduction, said reduced alumina-supported catalyst having residual anions remaining thereon, said Group VIII catalyst being an elemental Group VIII metal having an atomic number between 28 and 78, inclusive, and said anions forming acid when contacted by hydrogen, which comprises:

a. treating said alumina supported catalyst with at least about 0.002 weight parts per weight part of said alumina support of an alkali metal or alkaline earth metal provided from a salt or hydroxide of an alkali metal or alkaline earth metal inert to said catalyst; said treatment resulting in the formation of a salt of an alkali metal or alkaline earth metal with said residual anions; and

b. heating said treated alumina supported catalyst in the presence of hydrogen at a temperature less than about the minimum sintering temperature of said catalyst, the temperature of said heating being sufficient to volatilize or decompose the compound formed by the anion of said salt or hydroxide and said hydrogen.

3,974,104

DENTURE BASES OF X-RAY OPAQUE POLYMERS

John Foster, Sheerness, and Vallabhbhai Bhanabhai Ahir, London, both of England, assignors to The Amalgamated Dental Company Limited, London, England

Filed Mar. 14, 1973, Ser. No. 340,941

Claims priority, application United Kingdom, Mar. 15, 1972, 12135/72

Int. Cl.² C09K *3/00*

U.S. Cl. 252—478 **15 Claims**

1. A denture base formed of a copolymer of an ethylenically unsaturated monomer containing chemically bound tin together with at least one ethylenically unsaturated monomer which does not contain tin, the ethylenically unsaturated monomer containing chemically bound tin being an ester of trialkyl tin and an ethylenically unsaturated acid and the non-tin containing monomer comprising a major proportion by weight of a lower alkyl acrylate or lower alkyl methacrylate.

3,974,105

OVERTEMPERATURE AND OVERCURRENT RESISTOR FUSE

Kunio Sato, Neyagawa; Tomio Ishida, and Kanji Sugihara, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 29, 1974, Ser. No. 474,442
Claims priority, application Japan, May 30, 1973, 48-61312
Int. Cl.² H01B 1/02; H01C 1/02
U.S. Cl. 252—512 6 Claims

1. An overtemperature and overcurrent resistor fuse comprising a resistor body consisting essentially of:

30 – 90% by weight finely divided conductive powder, said conductive powder consisting essentially of a fusible metal selected from the group consisting of tin, lead, cadmium, bismuth, indium and fusible alloys thereof;

1 – 20% by weight of an organic flux powder, said organic flux powder consisting essentially of an organic substance selected from the group consisting of and stearic acid, benic acid, glutamic hydrochloride, water-white rosin and water-white rosin with activators.

the balance by weight of a resin in which said powders are dispersed, said resin consisting essentially of a member selected from the group consisting of phenol resin, urea resin, melamine resin, epoxy resin, unsaturated polyester resin, polyethylene, polypropylene, polyvinylidene chloride, polystyrene, aerylonitrile-butadiene-styrene resin, butadiene-styrene, butyl rubber, ethylene-propylene rubber and mixtures thereof,

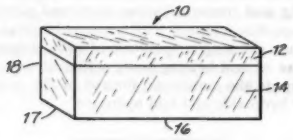
said resistor body having an opening temperature above which particles of said conductive powder are aggregated due to melting into a plurality of separate bodies of aggregated conductive materials insulatively dispersed in said resin.

3,974,106

CERAMIC ELECTRICAL RESISTANCE IGNITER

David W. Richerson, Tempe, Ariz., assignor to Norton Company, Worcester, Mass.

Filed May 22, 1974, Ser. No. 472,099
The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.
Int. Cl.² H01B 1/04
U.S. Cl. 252—516 2 Claims



1. A ceramic resistance igniter comprising a sintered mixture of from 10 to 60% by weight of silicon carbide having an average grain size of 10 microns or less, and 40 to 90% by weight of a material selected from the group consisting of silicon nitride, silicon aluminum oxynitride, silicon oxynitride and mixtures thereof, material having an average grain size of 10 microns or less; and sintered mixture having a density of at least 90% of its theoretical density, a room temperature resistivity of from 0.1 to 10^4 ohm centimeters, a modulus of rupture in excess of 80,000 p.s.i. measured at room temperature and under 3 point loading, and having a resistance differential between the terminal connecting ends of said igniter and the intermediate zone thereof; the resistance of said terminal ends being less than 75% of that of said intermediate zone, and having a composition of from 12 to 60% by weight of silicon carbide and 38 to 88% by weight of a material selected from the group consisting of silicon nitride, silicon oxynitride, silicon aluminum oxynitride, and mixtures thereof, said silicon carbide content being at least 2% by weight higher than that of the intermediate zone; said igniter being capable of attaining a temperature of at least 1000°C within 3 minutes.

3,974,107

RESISTORS AND COMPOSITIONS THEREFOR

Peter Francis Carcia, Lewistown, N.Y., assignor to E. I. Du-Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 27, 1974, Ser. No. 455,364
Int. Cl.² H01B 1/06; H01C 1/06, 7/00
U.S. Cl. 252—520 53 Claims

1. A film resistor adherent to a dielectric substrate wherein the resistor comprises a conductive phase of crystalline particles of (1) pyrochlore-related oxides and (2) metal titanates, each dispersed in a matrix of a lead containing glass, said pyrochlore-related oxides being selected from among those of formula

$$(M_xBi_{2-x})(M'_yRu_{2-y})O_{7-z},$$

wherein

M is at least one metal selected from the group consisting of yttrium, indium, cadmium, lead, and the rare earth metals of atomic number 57–71, inclusive;

M′ is at least one metal selected from the group consisting of platinum, titanium, tin, chromium, rhodium, iridium, zirconium, antimony, and germanium;

x is a number in the range 0–2;

y is a number in the range 0–2; and

z is a number in the range 0–1, being at least equal to about $x/2$when M is a divalent metal; those of the formula

$$M_xM'_{2-x}M''_2O_{7-z},$$

wherein

M is at leat one of Ag or Cu;

M′ is Bi or a mixture of at least one half Bi plus up to one half of one or more cations from among

a. bivalent Cd or Pb and

b. trivalent Y, Tl, In, and rare earth metals of atomic number 57–71, inclusive;

M″ is at least one of

a. Ru,

b. Ir, and

c. a mixture of at least three-fourths of at least one of Ru and Ir and up to one-fourth of at least one of Pt, Ti, and Rh;

x is in the range 0.10 to 0.60, and

z is in the range 0.10 to 1.0, and is equivalent to the sum of monovalent cations M and half of divalent cations in said formula; and mixtures thereof.

19. A powder composition useful for forming film resistors on a dielectric substrate, the powder comprising pyrochlore-related oxides and a titanium material selected from the class consisting of

1. a metal titanate and a glass comprising at least 10 weight percent PbO dissolved therein,
2. one or more glasses at least one of which comprises at least 5 weight percent titanium dioxide dissolved therein and a metal oxide and is capable of crystallization to form a metal titanate upon being heated and
3. titanium oxide and a glass comprising at least 10 weight percent PbO dissolved therein,

said pyrochlore-related oxides being selected from among those of the formula

$$(M_xBi_{2-x})(M'_yRu_{2-y})O_{7-z},$$

wherein

M is at least one metal selected from the group consisting of yttrium, indium, cadmium, lead, and the rare earth metals of atomic number 57–71, inclusive;

M′ is at least one metal selected from the group consisting of platinum, titanium, tin, chromium, rhodium, iridium, zirconium, antimony, and germanium;

x is a number in the range 0–2;

y is a number in the range 0–2; and
z is a number in the range 0–1, being at least equal to about *x*/2 when M is a divalent metal; those of the formula $M_xM'_{1-x}M''_2O_{7-7}$, wherein
M is at least one of Ag or Cu;
M′ is Bi or a mixture of at least one half Bi plus up to one half of one or more cations from among
a. bivalent Cd or Pb and
b. trivalent Y, Tl, In, and rare earth metals of atomic number 57–71, inclusive;
M″ is at least one of
a. Ru,
b. Ir, and
c. a mixture of at least three-fourths of at least one of Ru and Ir and up to one-fourth of at least one of Pt, Ti, and Rh;
x is in the range 0.10 to 0.60, and
z is in the range 0.10 to 1.0, and is equivalent to the sum of monovalent cations M and half of divalent cations in said formula; and mixtures thereof.

3,974,108
$LaCeO_3$ ELECTRODES AND METHOD OF MANUFACTURE

Ronald Staut, and Peter E. D. Morgan, both of Cherry Hill, N.J., assignors to General Refractories Company, Bala Cynwyd, Pa.

Filed Nov. 19, 1974, Ser. No. 525,064
Int. Cl.² H01B *1/08*
U.S. Cl. 252—521 **4 Claims**

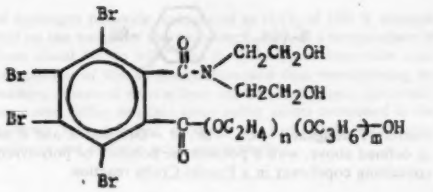
1. A method for producing an electrode body having the composition $(La_{1-x}\ Sr_x)\ CrO_3$, $(La_{1-x}\ Ca_x)\ CrO_3$, $(La_{1-x}\ Mg_x)\ CrO_3$, or $La_1\ Mg_x\ Cr_{1-x}\ O_3$, where x = 0 to 0.3, and a density in excess of 90% of theoretical, comprising the steps of:
a. forming an aqueous solution of chromic acid, and reacting lanthanum oxide and strontium, calcium or magnesium carbonate or hydroxides or oxides in proportions to provide the aforesaid composition;
drying said thick slurry to a dry cake;
c. calcining said dry cake to a temperature of about 1000° to 1600°C.;
d. grinding the calcined cake to a powder of particle size of less than about 100 mesh;
e. forming said powder to an electrode-shape; and
f. firing said electrode shape in an oxidizing atmosphere to a temperature of about 1500° to 2300°C.

3,974,109
POLYURETHANES CONTAINING HALO-ARYL AMIDE-ESTER POLYOLS

Anthony Joseph Papa, St. Albans, W. Va., and William Robert Proops, Claymont, Del., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 172,296, Aug. 16, 1971, Pat. No. 3,833,641. This application July 15, 1974, Ser. No. 488,495
Int. Cl.² C08G *18/14*, *18/46*
U.S. Cl. 260—2.5 AV **23 Claims**

1. A process for producing a flame-retarded flexible polyurethane foam which comprises reacting and foaming a reaction mixture containing: (1) an organic polyisocyanate; (2) a polyether polyol having a hydroxyl number between about 32 and about 150; (3) a flame-retardant comprising a tetrabromophthalyl amide-ester triol having the formula,



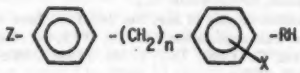
where *n* and *m* each has a value of from 0 to about 3 and the sum *n*+*m* has an average value of from about 1 to about 3, the said flame-retardant being present in said reaction mixture in an amount sufficient to incorporate in the polyurethane product between about 2 and about 8 weight percent halogen, based on the combined weight of (1), (2) and (3); (4) a blowing agent comprising water; and (5) a catalyst comprising an amine for the polyurethane-forming reaction.

3,974,110
MODIFICATION OF POLYSTYRENE BY FRIEDEL-CRAFTS REACTION WITH SUBSTITUTED HALO ETHYL BENZENES AND HALOETHYLPHENOLS TO MAKE SUPPORTS FOR SOLID PHASE PEPTIDE SYNTHESIS

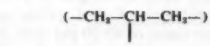
Abraham Patchornik, Ness-Ziona; Rami Kalir, Rehovot; Matityahu Fridkin, Holon, and Abraham Warshavsky, Rehovot, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Oct. 3, 1974, Ser. No. 511,687
Claims priority, application Israel, Oct. 4, 1973, 43366
Int. Cl.² C07C *103/52*; C07G *7/00*
U.S. Cl. 260—2.5 HB **7 Claims**

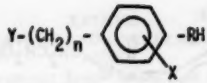
1. A process for producing reagents useful for effecting reactions of organic synthesis, of the general formula



wherein
Z designates the



part of a polymeric backbone of a polymer like polystyrene, a copolymer comprising polystyrene and a comonomer like divinylbenzene, butadiene and other copolymers comprising styrene;
n is an integer from 1 to 8, inclusive;
R designates oxygen or sulfur;
X designates nitro, carbonyl, carboxyl, cyano-carbalkoxy or a carboxamido group which may be substituted on the nitrogen atom, or a halogen atom, or alkyl, unsaturated alkyl, aralkyl;
or where RH and X together designate hydroxytriazole which comprises reacting a compound of the general formula



wherein *Y* designates —Cl, —Br, or —OH, and *X* and *R* are as defined above, with a polystyrene polymer or polystyrene containing copolymer in a Friedel-Crafts reaction.

3,974,111

POLYMERIC ALKOXIDES BASED ON HYDROXYALKYL METHACRYLATES AND A METHOD FOR THEIR PREPARATION

Lubomír Lochmann; Jiří Coupek, and Jiří Trekoval, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

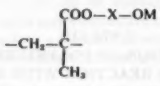
Filed Dec. 18, 1974, Ser. No. 534,153

Claims priority, application Czechoslovakia, Dec. 28, 1973, 9065-73

Int. Cl.² C08F *20/26, 8/41*

U.S. Cl. 260—2.5 R **4 Claims**

1. A copolymer having a polymerized alkylene dimethacrylate having repeating units represented by the formula



wherein X is an alkylene group having from 2 to 20 carbon atoms and M is Li, Na or K.

2. The copolymer of claim 1, wherein said copolymer possesses a heterogeneous structure of a macroporous gel having an inner surface area of from 0.5 to 500 m^2/g.

3,974,112

FOIL LAMINATING ADHESIVE

Donald Nadler, Somerset, and Carl F. Witzmann, Murray Hill, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 366,192, June 1, 1973, abandoned. This application Feb. 28, 1975, Ser. No. 553,929

Int. Cl.² C08L *7/02, 11/00, 23/04, 27/06*

U.S. Cl. 260—4 R **6 Claims**

1. A foil laminating adhesive consisting essentially of:

A. an aqueous solution of a carboxylated vinyl acetate copolymer selected from the group consisting of copolymers of vinyl acetate and crotonic acid in the monomer ratios of 92.5:7.5 per cent, by weight, to 87.5:12.5 per cent, by weight; copolymers of vinyl acetate and maleic acid in the monomer ratios of 80:20 per cent, by weight, to 90:10 per cent, by weight; and copolymers of vinyl acetate and fumaric acid in the monomer ratios of 80:20 per cent, by weight, to 90:10 per cent, by weight; and

B. a compatible, foil adherent, latex adhesive selected from the group consisting of latices of natural rubber, styrene-butadiene rubber, polychloroprene, butyl rubber, polyvinyl acetate homopolymers, copolymers of ethylene and vinyl acetate, copolymers of ethylene and vinyl chloride, copolymers of butyl acrylate and vinyl acetate and copolymers of vinyl acetate and vinyl chloride; wherein the carboxylated vinyl acetate copolymer is present in a proportion of 1 to 100 parts, by weight, per 100 parts, by weight, of latex adhesive solids.

3,974,113

LIQUID MODIFIED EPOXY RESINS AND THEIR PREPARATION

Daniel R. Sassano, Monroeville, and Leonard E. Edelman, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

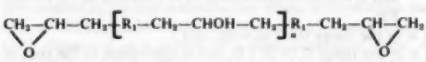
Filed Dec. 28, 1971, Ser. No. 213,164

Int. Cl.² C08J *3/02*

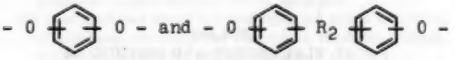
U.S. Cl. 260—18 EP **13 Claims**

1. A method of making a liquid modified epoxy resin comprising heating under non-hydrolyzing conditions to the clear pill stage

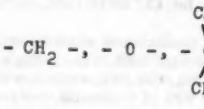
1. about 20 to about 80% of at least one diglycidyl ether of a diphenol having the formula



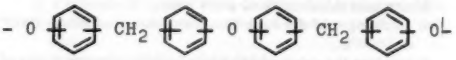
where R_1 is a diphenol radical selected from the group consisting of



where R_2 is selected from the group consisting of



and



and *n* is an average of about 0 , with

2. about 20 to about 80% of at least one non-hydroxylated drying oil, in the presence of

3. about 0.0025 to about 0.1% (based on weight of (1) plus (2) of a catalyst selected from the group consisting of alkali and alkaline earth metal compounds which have a pH greater than 7.

3,974,114

COMPOUND FOR PINHOLE-FREE ROTATIONAL CASTING

Michael William Sowa, East Brunswick, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 847,431, Aug. 4, 1969, abandoned. This application June 30, 1971, Ser. No. 158,572

Int. Cl.² C08J *3/20*

U.S. Cl. 260—23 H **21 Claims**

1. An olefin polymer-based composition adaptable for use in rotational molding applications and consisting essentially of olefin polymer selected from the group consisting of olefin homopolymers, interpolymers of one or more olefins with each other, and interpolymers of one or more olefins and up

to about 50 weight per cent of one or more other monomers which are copolymerizable with such olefins,

stabilizing effective quantities of at least one antioxidant for said olefin polymer, and

about 0.001 to 0.05 per cent by weight, based on the weight of said olefin polymer, of fatty acid salt selected from the group consisting of the calcium, lithium, magnesium, barium, cadmium and aluminum salts of the C_8 to C_{18} fatty acids,

said composition being in powder form and adapted to pass through a ⩾ 15 mesh screen.

3,974,115

WATER-SOLUBLE WIRE ENAMEL

Deno Laganis, Schenectady, N.Y., assignor to Schenectady Chemicals, Inc., Schenectady, N.Y.

Continuation-in-part of Ser. No. 311,701, Dec. 7, 1972, abandoned. This application Dec. 27, 1974, Ser. No. 536,963

Int. Cl.² C08L *67/02, 73/00*

U.S. Cl. 260—29.2 N **22 Claims**

1. A composition comprising:

1. A water-soluble polyester which is a condensation product of a polycarboxylic acid and a polyhydric alcohol said polycarboxylic acid comprising (a) a tribasic carboxylic acid and (b) an aromatic dicarboxylic acid with 0 to 0.50 mol of an aliphatic or cycloaliphatic dicarboxylic acid per mol of the aromatic dicarboxylic acid, said polyhydric alcohol comprising a dihydric alcohol, the molar ratio of tribasic carboxylic acid to the other acids present being from 25/75 to 85/15, there being present an excess of hydroxyl groups over carboxyl groups in said polyester in the range of 10 to 5 percent,

2. hydroxymethylated diacetone acrylamide in an amount of 0.1 to 10 percent by weight of the total solids as a cross-linking agent for said polyester, and

3. 0.5 to 10 percent by weight of the total solids of a water soluble organic titanate as a synergistic cross-linker with (2).

3,974,116

EMULSION SUSPENSIONS AND PROCESS FOR ADDING SAME TO SYSTEM

Kenneth J. Lissant, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 20, 1974, Ser. No. 452,846

Int. Cl.² C08J *3/12;* **C08L** *91/00*

U.S. Cl. 260—29.2 UA **15 Claims**

1. A stable suspension of a solid particulate soluble polymer in a high internal phase ratio emulsion, said emulsion containing an emulsifying agent, a liquid oil and liquid non-oily phase, neither of which as present in the emulsion substantially dissolve, swell or react with the particulate polymer normally soluble in at least one of the phases, said non-oily phase having a cohesive energy density number in excess of about 10.

3,974,117

PROCESS FOR THE MANUFACTURE OF AQUEOUS COPOLYMER DISPERSIONS

Gunther Illmann, and Norbert Mayer, both of Augsburg, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 30, 1974, Ser. No. 519,246

Claims priority, application Germany, Nov. 2, 1973, 2354681

Int. Cl.² C08L *33/06*

U.S. Cl. 260—29.6 TA **2 Claims**

1. A process for the manufacture of an odorless and colorless aqueous copolymer dispersion which can be rendered water-clear and does not discolor by polymerizing an acrylate, a methacrylate and an unsaturated acid and optionally a small amount of styrene in the presence of a mercapto compound as regulator which comprises incorporating from 0.1 to 5.0 % of hydrogen peroxide, calculated as H_2O_2 of 100 % strength and on the weight of the monomers used, at a temperature of from about 60° to 95°C into the copolymer dispersion after completion of the polymerization and thus transforming remaining traces of mercaptans, colored impurities, colloidally separated sulfur and thio ether sulfur atoms contained in the polymer into odorless products or hydrophilic sulfoxides, sulfones and sulfonic acids respectively.

3,974,118

COPOLYMER COATING COMPOSITIONS

Bruce Samways, Weston-Super-Mare; Edward George Sanderson, and Arthur John Norman Tamlyn, both of Bridgwater, all of England, assignors to British Cellophane Limited, England

Filed July 24, 1974, Ser. No. 491,953

Int. Cl.² C08L *27/08*

U.S. Cl. 260—29.6 WQ **7 Claims**

1. A method for the manufacture of a copolymer coating composition comprising copolymerising at least two copolymerisable monomers in dispersion in an aqueous medium in the presence of a surfactant to provide a dispersion of the copolymer containing between 30% and 70% by weight of the solids, the at least two copolymerisable monomers consisting essentially of between 75% and 96% by weight of vinylidene chloride and between 4% and 25% by weight of at least one copolymerisable ethylenically unsaturated monomer, then adding the copolymer dispersion with agitation to a sufficient amount of a volatile organic solvent for the copolymer to provide a water-in-solvent emulsion containing between 10% and 25% by weight of copolymer in which the copolymer is held in the continuous organic solvent phase.

3,974,119

ETHYLENE-STYRENIC-ALKYL VINYL TERPOLYMER EMULSIONS HAVING PARTICLE SIZE OF 100 TO ABOUT 1000 ANGSTROM UNITS

Glenn Edward Teer; Jerry Gene Higgins, and George D. Warren, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Big Spring, Tex.

Filed Jan. 20, 1975, Ser. No. 542,307

Int. Cl.² C08L *23/16*

U.S. Cl. 260—29.6 RB **23 Claims**

1. A process for producing stable polymer emulsions of polymer particles comprising terpolymers of ethylene, a styrenic monomer and alkyl vinyl monomer which includes contacting ethylene with an aqueous medium comprising from about 0.1 to about 80% by weight of the aqueous medium of said styrenic monomer and from about 0.1 to about 5.0% by weight of the aqueous medium of an alkyl vinyl compound having from about 3 to about 24 carbon atoms, at a temperature in the range of from about 60°C to about 150°C and an elevated pressured in the presence of a water soluble persulfate initiator, and an effective amount of an emulsifier selected from non-ionic and anionic emulsifiers and mixtures thereof to form said emulsion.

3,974,120

FLUOROSILICONE COPOLYMERS AND PROCESS FOR THE PREPARATION THEREOF

John S. Razzano, Watervliet, and Verne G. Simpson, Mechanicville, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed May 5, 1975, Ser. No. 574,331

Int. Cl.² C08K *5/15*

U.S. Cl. 260—30.4 SB **8 Claims**

1. A process for producing diorganopolysiloxane copolymers having a viscosity of from 100,000 to 200,000,000 centipoise at 25°C. comprising (a) forming an admixture of

i. a cyclic polysiloxane of the formula,

$(CF_3CH_2CH_2)(R)SiO_2$

wherein R is methyl, ethyl, vinyl or phenyl,

ii. a second cyclic polysiloxane of the formula,

$(R_2SiO)_3$

wherein R is, independently, as defined above, (i) being present in an amount of from 40 to 85 mol % of the total of (i) and (ii), (iii) is from 5 to 300 parts per million of an alkyl lithium catalyst, the alkyl compound containing from 1 to 12 carbon atoms, and (iv) an aprotic solvent, said aprotic solvent being capable of dissolving both of the trimers (i) and (ii) and the copolymer product; (b) reacting said admixture at a temperature between 0°C. and 150°C. to form said copolymer; and (c) recovering said copolymer from the reaction mixture.

3,974,121
BRANCHED NITROPOLYPHENYLENES AND COMPOSITIONS THEREFROM

Chen-Shen Wang, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 529,855, Dec. 5, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,034

Int. Cl.² C08L 65/02

U.S. Cl. 260—37 R **20 Claims**

1. A branched nitropolyphenylene comprising benzene ring structures bonded into a polymer chain and from 0.25 to 15 percent by weight of nitrogen wherein infrared absorbance occurs at frequencies of about 1,345 cm^{-1} and about 1,525 cm^{-1} and at least 8% of the linear infrared absorbance spectrum integrated peak area within the frequency range 726–930 cm^{-1} is within the frequency range 865–930 cm^{-1}.

3,974,122
HEAT-CURABLE SILICONE RESIN COMPOSITIONS

Yasuhiko Sato; Akitoshi Komiya, and Toshio Shiobara, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,331

Claims priority, application Japan, Oct. 19, 1974, 49-120491; Oct. 19, 1974, 49-120492; July 23, 1975, 50-89826

Int. Cl.² C08L 83/04

U.S. Cl. 260—37 SB **18 Claims**

1. A silicone resin molding composition which comprises

a. 100 parts by weight of an organopolysiloxane composed of the organosiloxane units (i) $(R^1SiO_{1.5})$, (ii) (R_2^1SiO) and (iii) $(R_3^1SiO_{0.5})$ bonded to each other at random, where R^1 is a hydroxy group directly bonded to the silicone atom or a substituted or unsubstituted monovalent hydrocarbon group, from 2.0 to 45.0 mole % of said hydrocarbon group being vinyl groups and the amount of said hydroxy groups being in the range from 0.75 to 7% by weight, and the mole fractions x, y and z for the organosiloxane units (i), (ii) and (iii) are from 0.50 to 0.95 inclusive, from 0.05 to 0.35 inclusive and from 0 to 0.05 inclusive, respectively,

b. from 10 to 150 parts by weight of an organopolysiloxane composed of the organosiloxane units, (iv) $(R^2SiO_{1.5})$, (v) (R_2^2SiO) and (vi) $(R_3^2SiO_{0.5})$ and including in a molecule at least one block composed of from 5 to 1,000 of the organosiloxane units (v) bonded to each other linearly in an uninterrupted sequence, where R^2 is a substituted or unsubstituted monovalent hydrocarbon group, at least two of said R^2 groups in a molecule being vinyl groups, and the mole fractions u, v and w for the organosiloxane units (iv), (v) and (vi) are from 0 to 0.6 inclusive, from 0.07 to 0.998 inclusive and from 0 to 0.30 inclusive, respectively,

c. an organohydrogenpolysiloxane with at least two hydrogen atoms directly bonded to the silicon atoms in a molecule in an amount sufficient to give from 0.75 to 2.5 of said hydrogen atoms per one of the vinyl groups in the components (a) and (b) above, and

d. a catalytic amount of a platinum catalyst.

3,974,123
DYES FOR THERMOPLASTICS

Johannes Dehnert, Ludwigshafen, and Gunther Lamm, Hassloch, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

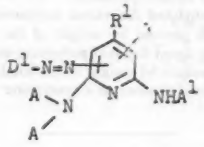
Filed Feb. 20, 1975, Ser. No. 551,493

Claims priority, application Germany, Mar. 1, 1974, 2409754; Aug. 2, 1974, 2437203; Aug. 8, 1974, 2438130

Int. Cl.² C08K 5/23, 5/45

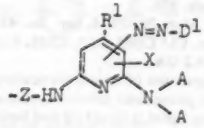
U.S. Cl. 260—40 P **7 Claims**

1. A thermoplastic resinous material which has been colored by mixing with a dye and distributing the dye homogeneously in the melt, said dye having the formula



wherein

A^1 is A or



D^1 is thienyl substituted by cyano, C_1- to C_5-alkyl, $C_{17}H_{35}$, phenyl or C_1- to C_8-alkoxycarbonyl;

R^1 is hydrogen or alkyl of 1 to 3 carbon atoms;

X is hydrogen, carbamoyl or cyano;

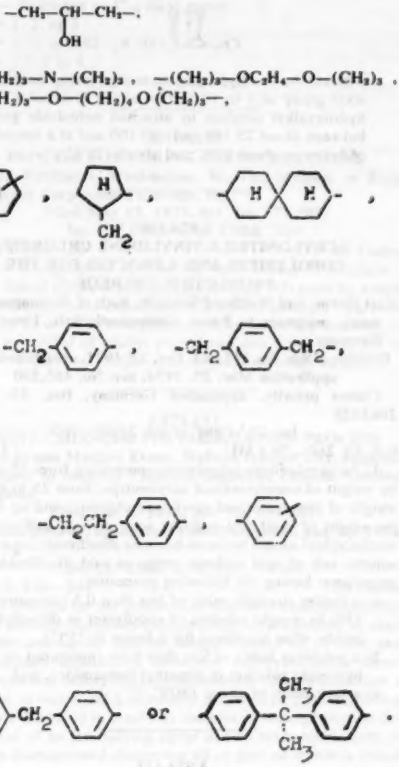
A is hydrogen; C_1 to C_8-alkyl; C_2- to C_8-alkyl substituted by hydroxy, OCHO, $OCOCH_3$, $OCOC_2H_5$, $OCOC_3H_7$, C_2- to C_4-hydroxyalkoxy, cyano, C_1- to C_8-alkoxy, C_1- to C_8-alkoxycarbonyl, phenoxy or phenyl; cyclohexyl; methylcyclohexyl; norbornyl; phenyl; β-hydroxy-β-phenylethyl; or $(CH_2)_3(OC_2H_4)_mOT$;

m is 1 or 2;

T is C_1- to C_4-alkyl, benzyl or phenyl;

is pyrrolidino, piperidino, morpholino, hexamethyleneimino piperazino, N-methylpiperazino or N-β-hydroxyethylpiperazino and

Z is C_2- to C_6-alkylene.



3,974,124

ENERGY ABSORBING VEHICLE BODY MATERIAL

Owen H. Pelham, Sr., Detroit, Mich., assignor to Woodall Industries Inc., Detroit, Mich.

Filed June 6, 1973, Ser. No. 367,636
Int. Cl.² C08K 7/02, 7/14
U.S. Cl. 260—40 R 5 Claims

1. A composition for use in molding an energy absorbing vehicle body panel, comprising an unsaturated polyester resin matrix unifromly mixed with glass fibers and synthetic thermoplastic fibers chosen from the group consisting of nylon, polyester and polyvinyl alcohol fibers, said resin matrix being relatively brittle as compared with said thermoplastic fibers, said thermoplastic fibers having suffficiently high denier and high tenacity as to provide substantial energy absorption when the panel is impacted, the lengths of said thermoplastic fibers being between ⅛ and ½ inch, the amount of thermoplastic fibers being 3 to 10% and of glass fibers 5 to 15% by weight, said thermoplastic fibers having a fiber diameter of 5 denier or more, a fiber tenacity of 5 grams per denier or more and an elongation of 8 to 40%.

3,974,125

HIGHER DIALKYL DIMETHYL AMMONIUM CLAY GELLING AGENTS FOR UNSATURATED POLYESTER COMPOSITIONS

Alexis A. Oswald, Mountainside, and Harry W. Barnum, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 27, 1974, Ser. No. 509,809
Int. Cl.² C08L 67/00
U.S. Cl. 260—40 R 22 Claims

1. A thixotropic unsaturated polyester composition consisting of major quantities of an unsaturated polyester substantially derived from a diol and a dicarboxylic acid and minor amounts of a styrene type monomer having a vinylic group directly attached to an aromatic ring in combination with a quaternary C_{14} to C_{24} dialkyl dimethyl ammonium clay in amounts sufficient to attain the desired thixotropic characteristics.

17. A process for the preparation of a thixotropic unsaturated polyester composition consisting of the steps of:

1. preparing, by mixing the components, a thixotropic pregel consisting of a styrene type monomer having a vinylic group directly attached to an aromatic ring and 0.5 to 25% by weight, based on the weight of styrene type monomer of a C_{14} to C_{22} dialkyl dimethyl ammonium clay gelling agent;
2. preparing, by mixing the components, the thixotropic gel consisting of 2 to 75 weight % of the pregel of the first step and an unsaturated polyester.

3,974,126

PROCESS AND APPARATUS FOR CONTINUOUS PRODUCTION OF POLYCARBONATES

Yoshihiro Narita; Hideo Konuma; Hiroshi Nishitani; Norio Komori, and Katsuharu Ogishima, all of Tokuyama, Japan, assignors to Idemitsu, Kosan Kabushiki-Kaisha, Tokyo, Japan

Filed June 25, 1974, Ser. No. 482,837
Claims priority, application Japan, June 27, 1973, 48-72618
Int. Cl.² C08G 63/62
U.S. Cl. 260—47 XA 13 Claims

1. A process for the continuous preparation of polycarbonate resins having an improved molecular weight distribution comprising the steps of:

a. reacting a mixture of a chloroformate ester oligomer and a dioxy compound under turbulent flow conditions to form a polycarbonate resin having a viscosity of 10–90% of the final viscosity of said polycarbonate resin; and
b. continuing the reaction under laminar flow conditions until said polycarbonate resin has a final viscosity of from 300 to 4,000 cps.

3,974,127

ALKYLENE OXIDE CONDENSATES OF TETRAMETHYLPIPERIDINE ALCOHOLS OR GLYCOLS

Murty S. Tanikella, Newark, Del., and Odorich Von Susani, Geneva, Switzerland, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 17, 1974, Ser. No. 506,724
Claims priority, application Germany, Sept. 17, 1973, 2346734
Int. Cl.² C08G 63/20, 63/46
U.S. Cl. 260—75 N 10 Claims

1. A mixture of alkylene oxide condensates which consists essentially of ring-substituted 2, 2, 6, 6-tetramethylpiperidine, having a substituent at the 1 position and/or a substituent at the 4 position of the ring, at least one of said substituents being an oxyalkyl substituent comprising polyoxyethylene and/or polyoxypropylene groups attached to the nitrogen atom of the ring through an alkylene group of 2 to 18 carbon atoms attached to the ring at the 4 position through an oxygen atom, the average number of oxyethylene and/or oxypropylene units per condensate being 3 to 200.

3,974,128
ESTERS OF MALEIC ANHYDRIDE INTERPOLYMERS

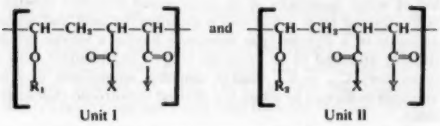
Ira Jordan Block, and Phillip Edward Sokol, both of Chicago, Ill., assignors to The Gillette Company, Boston, Mass.

Division of Ser. No. 251,362, May 8, 1972, Pat. No. 3,862,306. This application Feb. 4, 1974, Ser. No. 439,263

Int. Cl.² C08F *8/14, 222/12*

U.S. Cl. 526—14 **10 Claims**

1. A water-insoluble interpolymer consisting essentially of the structural units:



Unit I and Unit II

wherein R_1 represents an alkyl radical having from 8 to 18 atoms; wherein R_2 represents an alkyl radical having from 1 to 3 carbon atoms; and wherein X and Y each independently represent a radical selected from the group consisting of (1) an alkoxy radical having from 1 to 8 carbon atoms and (2) the hydroxy radical; the proportion of alkoxy radicals in the total number of X and Y radicals being from about 40 percent to about 60 percent; there being from about 0.01 to about 43 mole percent of Unit I and from about 57 to about 99.99 mole percent of Unit II in the interpolymer, based on the total number of moles of structural Units I and II in the interpolymer; the Brookfield viscosity of said interpolymer being from about 100 cps. to about 4,000 cps. at 25°C. and at 30% concentration in ethanol using a No. 2 spindle with a 250 cc. beaker, the percentage being based on the weight of the total solution.

3,974,129
POLYBUTADIENE RESIN

Harold E. De La Mare, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

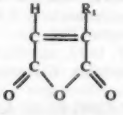
Filed July 24, 1975, Ser. No. 599,236

Int. Cl.² C08F *218/14*; C08G *81/00*

U.S. Cl. 204—159.24 **8 Claims**

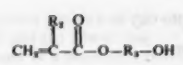
1. A curable resin composition prepared by:

a. reacting a low molecular weight polybutadiene homopolymer resin having an average molecular weight of between about 500 and about 10,000, a viscosity of between about 50 and about 3,000 centipoises, a cis content of between about 50% and about 95% and containing less than about 2% vinyl bonds with a polycarboxylic acid anhydride of the general formula



where R_1 is selected from the group consisting of H, CH_3, and Cl in the presence of an inhibitor selected from the group consisting of particulate copper, copper salts and copper chelate complexes at a temperature of between about 120°C and about 220°C and in a weight ratio of anhydride to polybutadiene resin of between about 5.95 and about 50:50 thereby forming a modified polybutadiene resin having a shifted double bond along the polymer chain and attached anhydride groups;

b. reacting said modified polybutadiene resin with a hydroxyalkyl acrylate of the general formula



wherein R_2 is a hydrogen or methyl group and R_3 is an alkyl group of 1 to 10 carbon atoms in a molar ratio of hydroxyalkyl acrylate to attached anhydride group of between about 25:100 and 100:100 and at a temperature of between about 80°C and about 120°C.

3,974,130
ACRYLONITRILE-VINYLIDENE CHLORIDE COPOLYMERS AND A PROCESS FOR THE PRODUCTION THEREOF

Karl Hurm, and Wolfhard Schmidt, both of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 211,665, Dec. 23, 1971, abandoned. This application Mar. 27, 1974, Ser. No. 455,330

Claims priority, application Germany, Dec. 23, 1970, 2063328

Int. Cl.² C08F *19/00, 23/00, 1/62*

U.S. Cl. 260—79.3 MU **1 Claim**

1. An acrylonitrile terpolymer comprising from 55 to 75% by weight of copolymerized acrylonitrile; from 25 to 45% by weight of copolymerized vinylidene chloride; and up to 10% by weight of methallyl sulfonic acid, styrene sulfonic acid, methacryloyl-amino benzene-benzene disulfimide, or a water-soluble salt of said sulfonic acids or said disulfimide, said terpolymer having the following properties:

a. a tinting strength value of less than 0.5 (measured on a 13% by weight solution of copolymer in dimethyl formamide, after treatment for 6 hours at 75°C),

b. a solubility index of less than 0.06 (measured on a 30% by weight solution in dimethyl formamide), and

c. a tack point of above 180°C.

3,974,131
AZIRIDINE MONOMERS AND COPOLYMERS

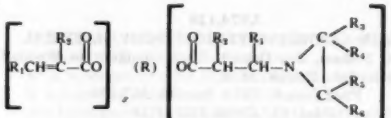
Joseph Emil Puskas, Yardville; William J. Shibe, Jr., and William Wood, both of Moorestown, all of N.J., assignors to Sybron Corporation, Rochester, N.Y.

Filed Feb. 14, 1975, Ser. No. 550,166

Int. Cl.² C08F *220/34, 226/02*

U.S. Cl. 526—263 **7 Claims**

1. A copolymer composition comprised of free radical polymerized aziridinyl monomer of the following structure:



wherein R=—$(R_7)_4C(CH_2)$— (b-z) where R_7=C_{1-5} alkyl group; z=0, 1, 2

or R=—$(CH_2—CH—O)_z—CH_2—CH—$ (R_8, R_4) where R_8=H or C_{1-5} alkyl group; z=1–9

or R=—$(CH_2—CH)_z$— (R_9) where R_9=H, C_{1-5} alkyl group; z=1–6

R_1— hydrogen or C_{1-5} alkyl group
R_2— hydrogen or C_{1-5} alkyl group
R_3— hydrogen or C_{1-5} alkyl group
R_4— hydrogen or C_{1-5} alkyl group
R_5— hydrogen or C_{1-5} alkyl group

R_6— hydrogen or C_{1-5} alkyl group
$x = 1, 2, \text{or } 3$
$y = 1, 2, \text{or } 3$
$x + y = 2 \text{ to } 4$
with ethenically unsaturated monomers.

3,974,132
PROCESS FOR CURING OLEFIN POLYMERS
Leo L. Valdiserri, Washington, W. Va., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed May 15, 1975, Ser. No. 577,585
Int. Cl.² C08F 8/40; C08K 5/49
U.S. Cl. 526—20 13 Claims

1. A composition suitable for heat curing to produce a cross-linked ethylene polymer comprising 100 parts by weight of a polyethylene, a copolymer of ethylene having a Tg greater than 25°C, or an EPDM polymer, from about 0.2 to about 20 parts by weight of triallyl phosphate, and from about 0.5 to about 10 parts by weight of an organic peroxide catalyst.

3,974,133
VINYL CHLORIDE POLYMERIZATION PROCESS
Dennis Ernest Mackley Evans, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England
Filed Jan. 8, 1975, Ser. No. 539,385
Claims priority, application United Kingdom, Jan. 23, 1974, 3100/74
Int. Cl.² C08F 2/18, 2/26, 14/06
U.S. Cl. 526—344 10 Claims

1. A process for the production of a vinyl chloride polymer which process comprises polymerising vinyl chloride or vinyl chloride and up to 30% by weight thereof of at least one ethylenically unsaturated monomer copolymerisable therewith, wherein before the commencement of polymerisation a mixture of water and a monomer soluble free radical yielding initiator dissolved in a solvent therefor is homogenised in the presence of an emulsifying agent and/or suspension agent to yield a homogenised dispersion all or part of which is mixed with the monomeric material to be polymerised and optionally further water, the monomeric material then being polymerised to form the vinyl chloride polymer.

3,974,134
RECOVERY PURIFICATION OF CHEESE WHEY PROTEIN FROM PROTEIN-POLYCARBOXYLIC ACID PRECIPITATES
Moshe Sternberg, South Bend, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.
Continuation-in-part of Ser. No. 353,895, April 23, 1973, Pat. No. 3,883,448. This application Jan. 13, 1975, Ser. No. 540,390
Int. Cl.² A23J 1/20
U.S. Cl. 260—112 R 4 Claims

1. A process for isolating and purifying protein from polycarboxylic acid-protein precipitates obtained by mixing an aqueous cheese whey solution with about 0.1 to about 1.0 percent, (weight/volume basis) based on the total volume of the mixture, of a polycarboxylic acid selected from the class consisting of poly-acrylic acid, hydrolyzed ethylene-maleic anhydride copolymers and hydrolyzed methyl vinyl ether-maleic anhydride copolymers at a pH from about 3 to 4.5 and at a temperature below about 30°C., which comprises:

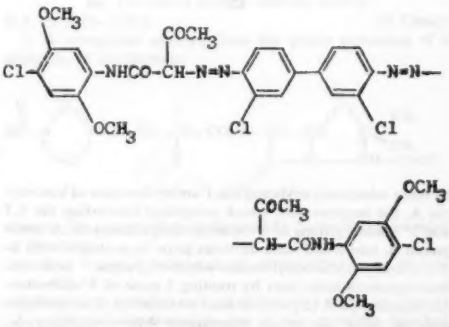
a. forming an aqueous solution of said precipitate having a pH between about 6 to about 9;
b. adding to said solution a substance selected from the class consisting of calcium salts, magnesium salts, barium salts and aluminum salts to form a precipitate with the polycarboxylic acid present; and
c. separating the purified protein solution from the resulting precipitate.

3,974,135
SYNTHETIC DECAPEPTIDE HAVING THE ACTIVITY OF THE LUTEINIZING HORMONE RELEASING HORMONE AND METHOD FOR PRODUCING THE SAME
Karl Folkers, 6406 Mesa Drive, Austin, Tex. 78731, and Hans Sievertsson, Organiska Avdelingen Farmacheutiska Fakulteten, Uppsala Universitet, Box 6804, 113 86 Stockholm, Sweden
Continuation-in-part of Ser. No. 156,520, June 24, 1971, abandoned. This application June 8, 1972, Ser. No. 261,007
Int. Cl.² C07C 103/52; C07G 7/00
U.S. Cl. 260—112.5 LH 2 Claims

1. A method for synthesizing the decapeptide, L-pglutamyl-L-histidyl-L-tryptophanyl-L-seryl-L-tyrosyl-glycyl-L-leucyl-L-arginyl-L-prolyl-glycinamide, comprising coupling, in appropriate protected forms, the amino acids, glycine, proline, arginine, leucine, glycine, tyrosine, serine, tryptophan, histidine, and pyroglutamic acid, said amino acids being sequentially coupled in their adjacently-named order and bound to a resin or carrier; and, releasing the protected decapeptide from said resin or carrier as the amide, the protected forms of said amino acids being provided by the protective groups, N-t-butyloxycarbonyl, N α -t-butyloxycarbonyl-N^G-nitro, N-T-butyloxycarbonyl-O-benzyl, N α -t-butyloxycarbonyl, N α -t-butyloxycarbonyl-N^{im}-p-toluenesulfonyl, N-carbobenzoxy.

3,974,136
MODIFIED FORM OF A DISAZO PIGMENT
Klaus Hunger, Kelkheim, Taunus; Joachim Ribka, Offenbach, Main, and Wolfgang Rieper, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed Jan. 17, 1974, Ser. No. 434,039
Claims priority, application Germany, Jan. 19, 1973, 2302509
Int. Cl.² C09B 43/00
U.S. Cl. 260—176 1 Claim

1. A disazo pigment of the formula



characterized by a specific surface of 12 – 20 m²/g, a maximum of the grain size distribution of between 500 and 1000 nm and a proportion of these grain sizes in the total distribution of between 35 and 65 %.

3,974,137

PROCESS FOR THE PREPARATION OF 1-[L-(−)-γ-AMINO-α-HYDROXYBUTYRYL]-KANAMYCIN A (RD-1341A)

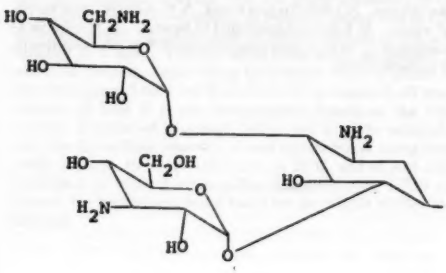
Richard Henry Schreiber, Canastota, and John Gerard Keil, Manlius, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 330,377, Feb. 7, 1973, abandoned. This application May 23, 1974, Ser. No. 472,781

Int. Cl.[2] A61K *31/71*; C07H *15/22*

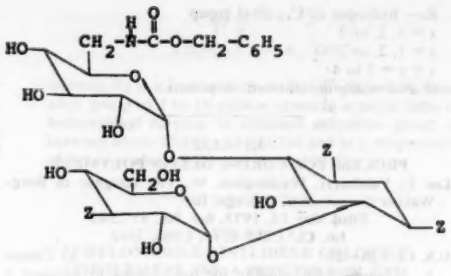
U.S. Cl. 536—10 5 Claims

1. In the process for the preparation of the compound having the formula



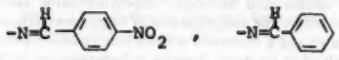
IV

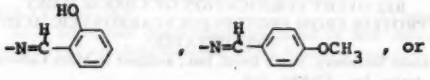
by more selectively acylating the 1-amino function of kanamycin A, the improvement which comprises converting the 1,3 and 3''-amino groups of 6'-carbobenzoxykanamycin A, compound II, into Schiff base moieties prior to acylation with L-(−)-γ-benzyloxycarbonyl-amino-γ-hydroxybutyric acid N-hydroxysuccinimide ester by treating 1 mole of 6'-carbobenzoxykanamycin A (II) with at least three moles of an aldehyde selected from the group comprising 4-nitrobenzaldehyde, benzaldehyde, salicylaldehyde, 4-methoxybenzaldehyde and pivaldehyde, in a (lower)alkanol, at elevated temperatures, for at least 2 hours, to produce the compound having the formula

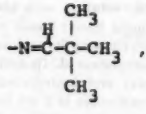


III

in which Z is







and hydrogenating the resultant intermediate to produce the compound of Formula IV.

3,974,138

METHOD OF PREPARING BUTYL POLYGLYCOSIDES

Baak W. Lew, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 315,542, Dec. 15, 1972, abandoned. This application Sept. 30, 1974, Ser. No. 510,554

Int. Cl.² C07H *15/04*

U.S. Cl. 536—4 8 Claims

1. A method of preparing a butyl polyglycoside having a degree of glycosidation equal to from 1.1to about 4, said method comprising

a. combining butyl alcohol and a monosaccharide selected from the group consisting of pentoses and hexoses at a molar ratio of butyl alcohol to monosaccharide equal to from 1 to about 25,

b. refluxing the resulting mixture in the presence of an acid catalyst, and

c. subsequently distilling butyl alcohol from the reaction mixture to reduce the molar ratio of butyl alcohol to monosaccharide to a final ratio equal to from about 0.6 to about 20, provided that (i) if the initial molar ratio is equal to from 1 to 5, the distillation of butanol is started prior to the point of sirupization.

3,974,139

DIETHYLAMINOHYDROXYPROPYL CELLULOSE I OR II AND A METHOD FOR PREPARING SAME

Rimas-Kazimeras Mechislovo Noreika, ulitsa Mitskevichaus, 39, kv. 206; Juozas-Romanas Juozo Musnitskas, prospekt 50 letiya SSSR, 33, kv. 97; Iolanta Vladimiro Lesene, ulitsa Poshkos, 12, kv. 1, and Ionas Iona Zdanavichjus, prospekt Raudonosios Armies, 35, kv. 20, all of Kaunas, U.S.S.R.

Filed July 12, 1974, Ser. No. 488,297

Int. Cl.² C08B *11/193*, *11/20*

U.S. Cl. 536—84 10 Claims

1. A method for preparing diethylaminohydroxypropyl cellulose having a maximum weight percentage of nitrogen of 1.6 and 6.3 respectively, and having the power to sorb 7.5 – 14 and 11.5 – 36 per cent of water vapor respectively at a temperature of 20°C and at a relative humidity of 63 per cent, comprising processing diethylaminohydroxypropyl cellulose, obtained by amination of natural cellulose or dehydrated cellulose with diethylepoxypropylamine in the presence of water, and having a maximum weight percentage of nitrogen of 1.6 and 6.3 respectively, and having the power to sorb a maximum 7.3 and 11 percent of water vapor respectively at a temperature of 20°C and at a relative humidity of 63 per cent, with acetic acid taking not less than 0.1 mole of acetic acid per mole of diethylaminohydroxypropyl groups, followed by washing to remove excess acetic acid.

3,974,140

UREIDOACETAMIDO-PENICILLINS

Hans-Bodo König; Wilfried Schröck, both of Wuppertal-Elberfeld; Hans Disselnkotter, Cologne, and Karl Georg Metzer, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

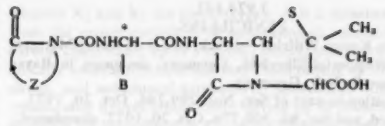
Division of Ser. No. 426,188, Dec. 19, 1973, which is a division of Ser. No. 145,809, May 21, 1971, abandoned, and Ser. No. 145,877, May 21, 1971, abandoned. This application Aug. 13, 1975, Ser. No. 604,480

Claims priority, application Germany, May 25, 1970, 2025414; May 25, 1970, 2025415

Int. Cl.² C07D *499/68*, *499/70*

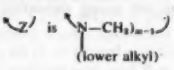
U.S. Cl. 260—239.1 6 Claims

1. A compound selected from the group consisting of a penicillin of the formula:



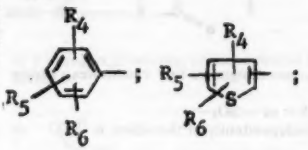
and the pharmaceutically acceptable nontoxic salts thereof wherein

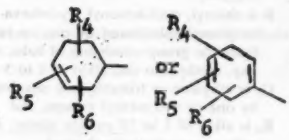
the carbon atom designated by * consitutes a center of chirality,



in which m is 3, 4 or 5, and

B is





wherein

R_4, R_5 and R_6 are the same or different, and are each hydrogen, halo, lower alkyl, lower alkoxy, lower alkylthio, lower alkylthionyl, lower alkylsulphonyl, nitro, di(lower alkyl)amino, lower alkanoylamino, hyroxy, or lower alkanoyloxy.

3,974,141

PENICILLINS

Hans-Bodo Konig; Wilfried Schrock, and Karl-Georg Metzger, Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

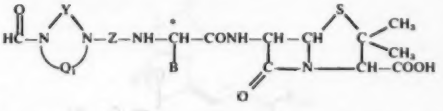
Continuation-in-part of Ser. Nos. 299,246, Oct. 20, 1972, abandoned, and Ser. No. 300,776, Oct. 20, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,668

Claims priority, application Germany, Oct. 23, 1971, 2152967; Oct. 23, 1971, 2152968

Int. Cl.² C07D *499/46*, *499/66*, *499/70*

U.S. Cl. 260—239.1 24 Claims

1. A compound selected from the group consisting of a penicillin of the formula



wherein the carbon atom designated by * constitutes a center of chirality;

each of Y and Z, independently of the other, is —CO— or —CS—;

B is thienyl cyclohexenyl, cyclohexa-1,4-dien-1-yl, phenyl or phenyl substituted by one or two members selected from the group consisting of halo. nitro, hydroxy, methoxy, methylthio and alkyl of 1 to 5 carbon atoms; and

Q_1 is ethylene or trimethylene unsubstituted or substituted by one or two methyl groups;

and the pharmaceutically acceptable salts thereof.

3,974,142
PENICILLINS

Hans-Bodo Konig; Wilfried Schrock, and Karl-Georg Metzger, all of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

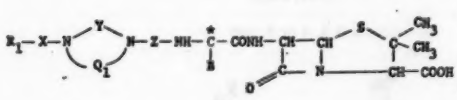
Continuation-in-part of Ser. Nos. 299,246, Oct. 20, 1972, abandoned, and Ser. No. 300,776, Oct. 20, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,956

Claims priority, application Germany, Oct. 23, 1971, 2152967; Oct. 23, 1971, 2152968

Int. Cl.² C07D *499/46*

U.S. Cl. 260—239.1 **85 Claims**

1. A compound selected from the group consisting of a penicillin of the formula



wherein the carbon atoms designated by * constitutes a center of chirality;

X is —CO—, —CS— or $-SO_2-$;

each of Y and Z, independently of the other, is —CO— or —CS—;

B is thienyl, cyclohexenyl, cyclohexa-1,4-dien-1-yl, phenyl or phenyl substituted by one or two members selected from the group consisting of halo, nitro, hydroxy, methoxy, methylthio and alkyl of 1 to 5 carbon atoms;

Q_1 is ethylene or trimethylene unsubstituted or substituted by one or two methyl groups; and

R_1 is alkyl of 1 to 10 carbon atoms; and the pharmaceutically acceptable salts thereof.

3,974,143
(16α)-16,17-ALKYLIDENEBIS(OXY)-3-ARYLPREGNA-2,4,6-TRIEN-20-ONES

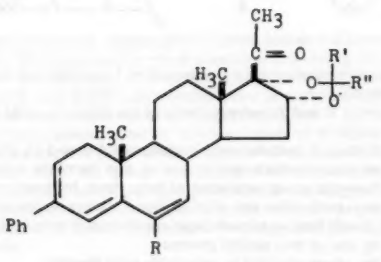
Charles S. Markos, Skokie, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Sept. 19, 1975, Ser. No. 614,938

Int. Cl.² C07J *21/00*

U.S. Cl. 260—239.55 D **12 Claims**

1. A compound of the formula



wherein Ph represents phenyl, alkylphenyl in which the alkyl contains fewer than 8 carbons, alkoxyphenyl in which the alkoxy contains fewer than 8 carbons, or halophenyl in which the halogen is meta or para fluorine, chlorine, or bromine; R represents hydrogen, methyl, fluorine, or chlorine; R′ represents hydrogen or alkyl containing fewer than 8 carbons; and R″ represents alkyl containing fewer than 8 carbons.

3,974,144
COMPOUNDS INCLUDING CARBOXYSTYRYLPHENYL GROUP

Nathan N. Crounse, Cincinnati, Ohio, and Kantilal B. Desai, Highland Heights, Ky., assignors to Sterling Drug Inc., New York, N.Y.

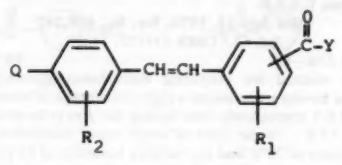
Continuation-in-part of Ser. No. 224,296, Feb. 7, 1972, Pat. No. 3,833,510. This application Nov. 19, 1973, Ser. No. 417,084

Claims priority, application Canada, Jan. 24, 1973, 161971

Int. Cl.² C07D *307/78, 333/52, 405/06, 409/06*

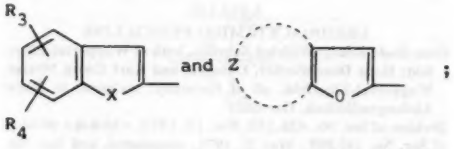
U.S. Cl. 260—240 CA **25 Claims**

1. A compound having low water solubility of the formula



wherein:

Q is a monovalent aromatic heterocyclic radical selected from the class having the formulas



X is oxygen or sulfur;

Y is —OR or

in which

R is hydrogen, lower akyl having one to six carbon atoms, hydroxy-lower alkyl having two or three carbon atoms, phenyl, benzyl, phenethyl or phenyl, benzyl or phenethyl substituted in the benzene ring thereof by lower alkyl of one to six carbon atoms, halo or alkoxy of one to six carbon atoms;

R^a is hydrogen, lower alkyl having one to three carbon atoms, phenyl, benzyl, phenethyl or phenyl, benzyl or phenethyl substituted in the benzene ring thereof by lower alkyl of one to six carbon atoms, halo or alkoxy of one to six carbon atoms;

Y^a is hydrogen or lower having one to three carbon atoms;

R^a and Y^a taken together with the nitrogen atom to which they are commonly bonded are pyrrolidino, piperidino or morpholino;

R_1 and R_2 are the same or different and are members of the class consisting of hydrogen, alkyl having one to six carbon atoms, alkoxy having one to six carbon atoms, and halo;

R_3 and R_4 are the same or different and are members of the class consisting of hydrogen, alkyl having one to six carbon atoms, alkoxy having one to six carbon atoms, cyano, halo, dialkylamino wherein each alkyl has one to six carbon atoms, alkanoylamino having one to six carbon atoms, phenyl, phenyl substituted by alkyl having one to six carbon atoms, halo, alkoxy having one to six carbon atoms, and alkanoylamino having one to six carbon atoms; and

Z is naphtho.

3,974,145

NOVEL N'-ACYLATED PHENYL-HYDRAZINE AND HYDROZONE DERIVATIVES

Michio Kimura, Minoo; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

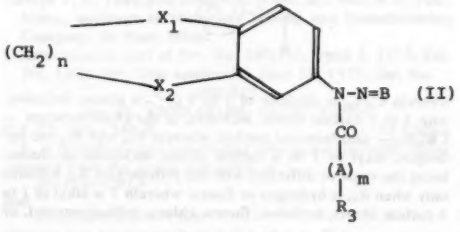
Division of Ser. No. 173,700, Aug. 20, 1971, Pat. No. 3,812,112. This application Feb. 4, 1974, Ser. No. 439,035

Claims priority, application Japan, Aug. 26, 1970, 45-75198; Aug. 27, 1970, 45-75818; Oct. 3, 1970, 45-86964; Dec. 9, 1970, 45-109768; Dec. 9, 1970, 45-109769; Dec. 9, 1970, 45-109771; Feb. 15, 1971, 46-6887; Feb. 16, 1971, 46-7492

Int. Cl.² C07D *317/66*

U.S. Cl. 260—240 K **2 Claims**

1. A compound of the formula,



wherein X_1 and X_2 are each oxygen; A is a member selected from the group consisting of unsubstituted saturated hydrocarbon chain haing up to 5 carbon atoms, unsubstituted ethylenically unsaturated hydrocarbon chain having up to 5 carbon atoms, and substituted saturated or substituted ethylenically unsaturated hydrocarbon chain having up to 5 carbon atoms in which the substituent is a member selected from the group consisting of halogen and phenyl; m is 0 or 1; n is 1 or 2; R_3 is a member selected from the group consisting of alkyl having up to 4 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, unsubstituted or C_1–C_4 alkyl-, nitro-, trifluoromethyl-, methylenedioxy, ethylenedioxy-, or halogen substituted phenyl, or halogen, C_1–C_4 alkyl- or phenyl-substituted or benzene ring-condensed C_5–C_7 cycloalkyl or unsubstituted, or halogen-, C_1–C_4 alkyl- or phenyl-substituted or benzene ring-condensed C_5–C_6 cycloalkenyl, and B is

or a nitrogen protecting system selected from the group consisting of

and a group derived from the reaction of a ketone or aldehyde with the hydrazine.

3,974,146

CYANOLPOXY INTERMEDIATES FOR PROSTAGLANDINS AND PROCESS FOR PREPARING SAME

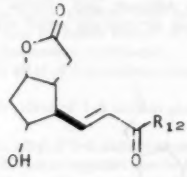
David R. White, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 9, 1975, Ser. No. 566,356

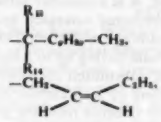
Int. Cl.² C07C *177/00*; C07D *307/77*

U.S. Cl. 260—240 R **32 Claims**

1. A process for preparing an optically active bicyclic lactone ketone of the formula



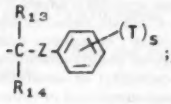
or a mixture of that compound and the enantiomer thereof, wherein R_{12} is



(1)

(2)

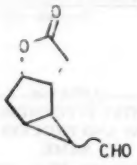
or



(3)

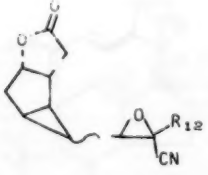
wherein C_pH_{2p} is alkylene of one to 9 carbon atoms, inclusive, with 1 to 5 carbon atoms, inclusive, in the chain between $-CR_{13}R_{14}-$ and terminal methyl; wherein R_{13} and R_{14} are hydrogen, alkyl of 1 to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that R_{13} is fluoro only when R_{14} is hydrogen or fluoro; wherein T is alkyl of 1 to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_{15}$, wherein R_{15} is hydrogen or alkyl of 1 to 4 carbon atoms, inclusive, and s is zero, 1, 2, or 3, with the proviso that no more than two T's are other than alkyl; and wherein Z represents an oxa atom (—O—) or C_jH_{2j}, wherein C_jH_{2j} is a valence bond or alkylene of 1 to 9 carbon atoms, inclusive, substituted with zero, 1, or 2 fluoro, with 1 to 6 carbon atoms, inclusive, between $-CR_{13}R_{14}-$ and the ring; which comprises

a. starting with a tricyclic lactone aldehyde of the formula



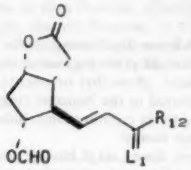
or a mixture of that compound and the enantiomer thereof, wherein ~ indicates attachment to the cyclopropane ring in endo or exo configuration, and reacting said aldehyde with a nitrile of the formula

wherein Hal is chloro, bromo, or iodo, the two Hal's being the same or different, and wherein R_{12} is defined as above, to form an optically active cyanoepoxide of the formula

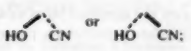


or a mixture of that compound and the enantiomer thereof, wherein R_{12} and ~ are as defined above;

b. reacting said cyanoepoxide with formic acid to produce an optically active cyanohydrin monoformate of the formula



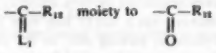
or a mixture of that compound and the enantiomer thereof, wherein R_{12} is as defined above and wherein L_1 represents



and

c. transforming the product of step (b) to said bicyclic lactone ketone by

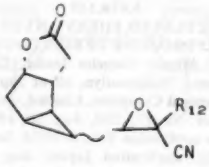
d. removing hydrocyanic acid by dehydrocyanation to convert the



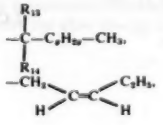
and

e. replacing formyl with hydroxyl, said steps (d) and (e) being performed either in the order (d)–(e) or (e)–(d).

11. A process for preparing an optically active tricyclic lactone cyanoepoxide of the formula



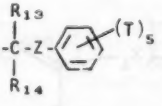
or a mixture of that compound and the enantiomer thereof, wherein R_{12} is



(1)

(2)

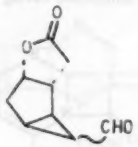
or



(3)

wherein C_pH_{2p} is alkylene of 1 to 9 carbon atoms, inclusive, with 1 to 5 carbon atoms, inclusive, in the chain between $-CR_{13}R_{14}-$ and terminal methyl; wherein R_{13} and R_{14} are hydrogen, alkyl of 1 to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that R_{13} is fluoro only when R_{14} is hydrogen or fluoro; wherein T is alkyl of 1 to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or

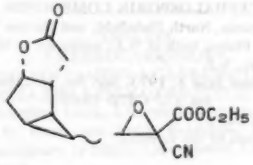
—OR_{13}, wherein R_{13} is hydrogen or alkyl of 1 to 4 carbon atoms, inclusive, and s is zero, 1, 2, or 3, with the proviso that not more than two T's are other than alkyl; and wherein Z represents an oxa atom (—O—) or C_jH_{2j}, wherein C_jH_{2j} is a valence bond or alkylene of 1 to 9 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with 1 to 6 carbon atoms, inclusive, between $—CR_{12}R_{14}—$ and the ring; and wherein ~ indicates attachment to the cyclopropane ring in endo or exo configuration; which comprises starting with a tricyclic lactone aldehyde of the formula



or a mixture of that compound and the enantiomer thereof, wherein ~ is as defined above, and reacting said aldehyde with a nitrile of the formula

wherein Hal is chloro, bromo, or iodo, the two Hal's being the same or different, and wherein R_{12} is defined as above.

27. An optically active compound of the formula



or a mixture of that compound and the enantiomer thereof wherein ~ indicates attachment in endo or exo configuration.

3,974,147

REDUCED STYRYL DYES

George V. D. Tiers, and Joseph A. Wiese, Jr., both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 347,193, April 2, 1973, Pat. No. 3,916,069. This application June 25, 1975, Ser. No. 590,321

Int. Cl.² C07D *401/06, 405/06, 413/06*

U.S. Cl. 260—240 D **12 Claims**

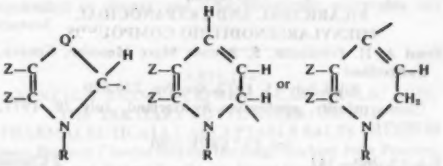
1. A N-hydrocarbyl substituted dihydroheterocyclic amine selected from the group consisting of

D—(CH=CH)$_n$A

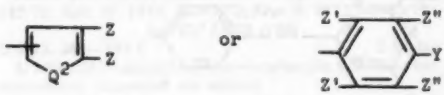
and

D—(CH=CH)$_n$CH=CAA'

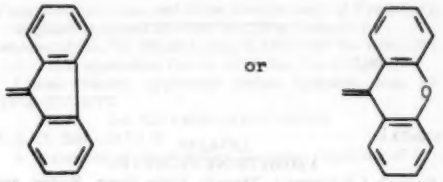
wherein n is an integer from 1–3 inclusive, D is:



A and A' are independently:



and A and A' when taken together with the carbon to which attached are:



R is hydrocarbyl;

Q' is =CR'R', S, O, Se or =NR';

Q² is O, S, Se, =NH, or =NR;

Z is hydrogen or taken together with an adjacent Z, the group of two may be either benzo- or naphtho- with or without an auxochromic substituent;

Y is H, Cl, F, Br, alkyl of 1–6 carbon atoms, OH, OR^2, SR^5 or NR^3R^4;

Z' is H, Cl, F, Br, alkyl of 1–6 carbon atoms, $—OR^5$ or $—NR_2^5$;

Z'' is H, Cl, F, Br, alkyl of 1–6 carbon atoms or $—OR^5$; or Z' and adjacent Z'' taken together can be benzo- or naphto- with or without auxochromic substituents;

R' is H, alkyl of 1–6 carbon atoms; phenyl or benzyl;

R^2 is alkyl of 1–6 carbon atoms;

R^5 is methyl or ethyl;

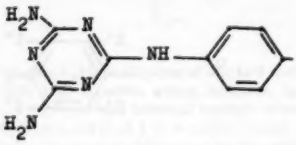
R^3 and R^4 are independently hydrocarbyl or halohydrocarbyl or taken together with an adjacent Z'' each can be independently 1,2-ethylene, 1,3-propylene or 1,2-phenylene or in conjunction with each other can form a 5–6 member ring including not more than 1 oxygen or one additional nitrogen.

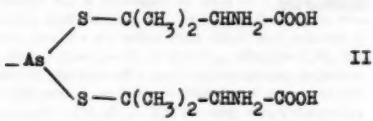
3,974,148
FILARICIDAL AND TRYPANOCIDAL PHENYLARSENODITHIO COMPOUNDS

Ernst A. H. Friedheim, 5, Avenue Marc Monnier, Geneva, Switzerland

Filed July 11, 1972, Ser. No. 270,820
Claims priority, application Switzerland, July 20, 1971, 10701/71
Int. Cl.² C07F 9/80
U.S. Cl. 260—242 2 Claims

1. The phenylarsenodithio compound of formula





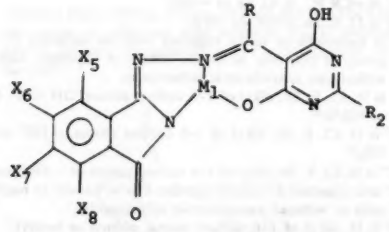
II

3,974,149
AZOMETHINE PIGMENTS

Francois L'Eplattenier, Therwil; Andre Pugin, Riehen, and Laurent Vuitel, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 30, 1974, Ser. No. 502,246
Claims priority, application Switzerland, Sept. 7, 1973, 12889/73
Int. Cl.² C09B 23/04, 55/00
U.S. Cl. 260—242 2 Claims

1. An azomethine pigment of the formula



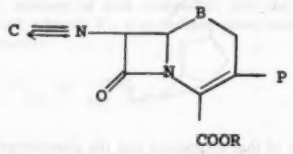
wherein M is, copper or nickel; R is hydrogen, or alkyl of 1–6 carbon atoms; X_6 and X_8 is hydrogen, halogen, or nitro; X_5 and X_7 is hydrogen, halogen, alkoxy of 1–6 carbon atoms, alkyl mercapto of 1–6 carbon atoms, cycloalkoxy containing 5–6 carbon atoms, phenoxy, chloro phenoxy, methyl phenoxy, or nitro; and R_2 is lower alkyl, phenyl, or phenyl substituted by methyl.

3,974,150
7β-ISOCYANO CEPHALOSPORIN ESTERS AND PROCESS OF PREPARATION

Martin Christopher Cook, Chalfont St. Peter, and Brian Laundon, Northold, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

Filed July 9, 1973, Ser. No. 377,247
Claims priority, application United Kingdom, July 21, 1972, 34298/72
Int. Cl.² C07D 499/44, 501/20
U.S. Cl. 260—243 C 5 Claims

1. A cephalosporin compound having the formula



(Ib)

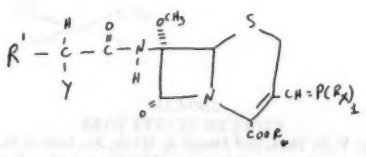
wherein R is a carboxyl blocking group and P is selected from the group consisting of lower alkyl, phenyl lower alkyl, chloromethyl, bromomethyl, iodomethyl, lower alkoxymethyl and lower alkanoyloxymethyl; and B is > S or > S → O.

3,974,151
CEPHALOSPORIN COMPOUNDS

Thomas R. Beattie, North Plainfield, and Burton G. Christensen, Scotch Plains, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed June 5, 1973, Ser. No. 367,256
Int. Cl.² C07D 501/20
U.S. Cl. 260—243 C 4 Claims

1. Compounds of the formula:



wherein R' is phenyl or thienyl; and y is Hydrogen, amino or carboxy.

3,974,152

3-ETHYL- AND 3-(2'CYANOETHYL)-CEPHALOSPORINS

Niall Galbraith Weir, London, England, assignor to Glaxo Laboratories Limited, Greenford, England

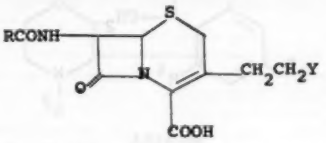
Continuation of Ser. No. 167,865, July 30, 1971, abandoned. This application Nov. 19, 1973, Ser. No. 416,853

Claims priority, application United Kingdom, Aug. 6, 1970, 38021/70

Int. Cl.[2] C07D *501/22*

U.S. Cl. 260—243 C 11 Claims

1. A cephalosporin antibiotic of the formula:



wherein:

Y is hydrogen or cyano and

R is phenoxymethyl; phenylthiomethyl; phenylcarbonyl; cyanomethyl or the group

in which R^6 is thien-2-yl; thien-3-yl; phenyl or phenyl substituted with halo, hydroxy, lower alkyl, nitro, amino, lower alkanoyl, lower alkoxy or lower alkylmercapto and X^1 is hydrogen, amino, hydroxy or carboxyl; or a physiologically acceptable salt thereof.

3,974,153

7-HYDROCARBONOXY IMINO-ACETAMIDO-3-CARBAMOYLOXY METHYLCEPH-3-EM-4-CARBOXYLIC ACIDS

Martin Christopher Cook, Liverpool; Gordon Ian Gregory, Chalfont, St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

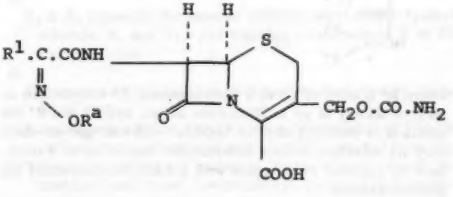
Continuation-in-part of Ser. No. 413,970, Nov. 8, 1973, which is a continuation-in-part of Ser. No. 304,524, Nov. 7, 1972, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Aug. 13, 1974, Ser. No. 497,113

Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71; Aug. 21, 1973, 39645/73

Int. Cl.[2] C07D *501/60*

U.S. Cl. 260—243 C 14 Claims

1. A compound selected from the group consisting of a cephalosprin antibiotic of the formula



wherein R^1 is furyl, thienyl, or phenyl; and R^a is C_{1-4} alkyl, C_{3-7} cycloalkyl or phenyl; and a physiologically acceptable salt thereof.

3,974,154

3-BENZYL-7-AMINO-3-CEPHEM-4-CARBOXYLIC ACID, THE TERTIARY BUTYL ESTER, OR THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

John Herbert Charles Nayler, Dorking; Michael John Pearson, Roffey, and Robert Southgate, Barns Green, all of England, assignors to Beecham Group Limited, England

Division of Ser. No. 303,960, Nov. 6, 1972, abandoned. This application Apr. 24, 1974, Ser. No. 463,541

Claims priority, application United Kingdom, Jan. 3, 1972, 143/72; Apr. 21, 1972, 18695/72; Sept. 9, 1972, 41973/72

Int. Cl.[2] C07D *1/18*

U.S. Cl. 260—243 C 2 Claims

1. 3-Benzyl-7-amino-3-cephem-4-carboxylic acid or a pharmaceutically acceptable salt thereof.

2. The tertiary butyl ester of 3-benzyl-7-amino-3-cephem-4-carboxylic acid or a pharmaceutically acceptable salt thereof.

3,974,155

2 AND 3-SUBSTITUTED-4-(HETEROCYCLIC-AMINO-SULFONYL)BENZENE SULFONAMIDES

Peter Edward Cross, and Brian Gadsby, both of Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

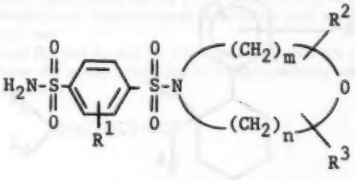
Division of Ser. No. 386,854, Aug. 9, 1973, Pat. No. 3,867,390. This application Oct. 4, 1974, Ser. No. 512,008

Claims priority, application United Kingdom, Aug. 12, 1972, 37720/72

Int. Cl.[2] C07D *295/14, 265/34*

U.S. Cl. 260—247.1 R 4 Claims

1. A compound selected from the group consisting of



and the salts thereof with pharmaceutically acceptable cations wherein R^1 is 3-trifluoromethyl, chloro, bromo or fluoro; *n* and *m* are each 2 or 3; R^2 and R^3, when taken separately, are each alkyl having 1 to 4 carbon atoms and R^2 and R^3, when taken together, are alkylene having 2 to 4 carbon atoms.

3,974,156

2-(SUBSTITUTED ANILINO) METHYLMORPHOLINE COMPOUNDS

Edwin Harry Paterson Young, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

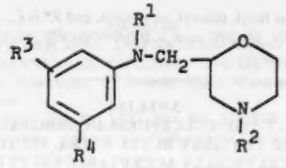
Filed Aug. 10, 1973, Ser. No. 387,379

Claims priority, application United Kingdom, Aug. 11, 1972, 37550/72

Int. Cl.[2] C07D *295/12*

U.S. Cl. 260—247.1 R 3 Claims

1. A morpholine selected from compounds of the formula:



wherein R^1 is hydrogen or acetyl of up to 4 carbon atoms; R^2 is hydrogen or alkyl of 1 to 6 carbon atoms; R^3 is halogen, alkyl of 1 to 4 carbon atoms, methoxy, methylthio or trifluoromethyl; and R^4 is hydrogen or trifluoromethyl; and the non-toxic, pharmaceutically acceptable acid-addition salts thereof.

3,974,157

1-(AMINO-ALKYL)-2-ARYL-CYCLOHEXANE ALCOHOLS AND ESTERS

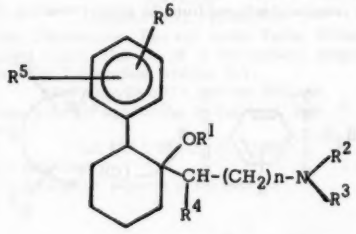
Bola Vithal Shetty, Rockville, Md., and Telfer Lawson Thomas, Pittsford, N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 447,804, March 4, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 545,074

Int. Cl.² C07D *295/00*

U.S. Cl. 260—247.2 B **24 Claims**

1. A compound having the formula:



wherein

R^1 is hydrogen or alkanoyl containing 1 to 8 carbon atoms;

R^2 and R^3 individually are hydrogen, alkyl containing 1 to 8 carbon atoms, or lower alkenyl containing 3 to 8 carbon atoms or

R^2 and R^3 together with the nitrogen to which they are attached form a morpholine radical, a piperazine radical or a ring structure containing 3 to 6 methylene groups;

R^4 is hydrogen or lower alkyl containing 1 to 8 carbon atoms;

R^5 and R^6 individually are hydrogen, lower alkyl containing 1 to 8 carbon atoms, hydroxyl, or lower alkoxy containing 1 to 8 carbon atoms;

n is 0 or 1;

the pharmaceutically acceptable acid addition and quaternary salts thereof;

and stereoisomers and optical isomers thereof.

3,974,158

2-(SUBSTITUTED ANILINO)METHYLMORPHOLINES

Edwin Harry Paterson Young, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

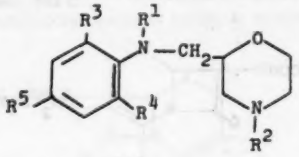
Filed Aug. 10, 1973, Ser. No. 387,378

Claims priority, application United Kingdom, Aug. 11, 1972, 37550/72

Int. Cl.² C07D *295/12*

U.S. Cl. 260—247.5 R **6 Claims**

1. A morpholine selected from compounds of the formula:



wherein R^1 is hydrogen or hydrocarbon aryloxycarbonyl of up to 11 carbon atoms; R^2 is hydrogen or alkyl of 1 to 6 carbon atoms; and R^3, R^4 and R^5, which may be the same or different, are hydrogen, halogen, alkyl or alkylthio of 1 to 6 carbon atoms, halogenoalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 10 carbon atoms, alkenyloxy or alkoxycarbonyl of up to 6 carbon atoms, hydrocarbon aroyl of up to 11 carbon atoms, hydrocarbon aryl, hydrocarbon aryloxy or hydrocarbon arylthio of up to 10 carbon atoms; and the non-toxic, pharmaceutically-acceptable acid-addition salts thereof.

3,974,159

MANUFACTURE OF DERIVATIVES OF MALONDIALDEHYDE

Martin Decker, Ludwigshafen; Willibald Schoenleben, Heidelberg; Herbert Toussaint, and Hewig Hoffmann, both of Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

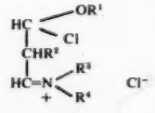
Filed Apr. 28, 1975, Ser. No. 572,135

Claims priority, application Germany, May 20, 1974, 2424373

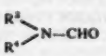
Int. Cl.² C07C *119/00, 131/00*

U.S. Cl. 260—247.5 R **3 Claims**

1. A process for the manufacture of a malondialdehyde derivative of the general formula



where R^1 is alkyl of up to 8 carbon atoms, R^2 is hydrogen or alkyl or alkoxy of up to 20 carbon atoms, and R^3 and R^4 are identical or different alkyl or, together with nitrogen to which they are attached, form a heterocyclic ring of up to 7 members, by reaction of phosgene with a dialkylformamide of the general formula



to give the dialkylformamide chloride and reaction of the dialkylformamide chloride with an enol ether (vinyl ether) of the general formula

$R^3-CH=CH-OR^1$

R^1, R^2, R^3 and R^4 having the above meanings, in which process the reactions are allowed to take place simultaneously.

3,974,160
WATER-INSOLUBLE REACTIVE DYESTUFFS WHICH ARE SOLUBLE IN APROTIC SOLVENTS

Herbert Seiler, Riehen, and Paul Dussy, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

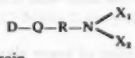
Division of Ser. No. 8,422, Feb. 3, 1970, Pat. No. 3,843,624. This application Nov. 2, 1973, Ser. No. 412,242

Claims priority, application Switzerland, Feb. 26, 1969, 2862/69; July 7, 1969, 10311/69

Int. Cl.² C07D *251/50*

U.S. Cl. 260—249 **3 Claims**

1. A reactive dyestuff, containing no acid, salt-forming, water-solubilizing groups, of the formula



wherein

D represents the radical of an anthraquinone dyestuff, which is unsubstituted or substituted only by halogen, cyano, nitro, lower alkyl, lower alkenyl, perfluoro(lower-)alkyl, hydroxy(lowr) alkyl, cyanoethyl, β,β-dicyanovinyl, lower alkoxy, phenoxy, methylphenoxy, lower alkylthio, phenylthio, lower alkanoyl, lower alkylsulphonyl, phenylsulfonyloxy, dimethylamino, amino, N-(β-cyanoethyl)-ethylamino, diethylamino, methylethylamino, ethylbenzylamino, ethylbutylamino, N-(β-hydroxyethyl)ethylamino, β-hydroxyethylamino, di(β-hydroxyethyl-)amino, N-(β-cyanoethyl)-β-hydroxyethylamino, di(β-cyanoethyl)amino, anilino, oxyanilino, methylamino, dimethylanilino, methylanilino, lower alkanoylamide, lower alkoxycarbonylamide, benzoylamide, lower alkylsulphonylamide, N-lower-alkyl- and N,N-diloweralkyl-lower alkylsulphonylamide or hydroxy,

Q represents a bridging member $-NX_3-$, $-O-$, $-S-$ or $-NX_3CO-$, wherein X_3 represents hydrogen or lower alkyl,

R represents triazinyl containing only chlorine, bromine or fluorine substituents, each of which can be split off as anion and which is bound to a ring carbon atom adjacent to a tertiary nitrogen atom,

X_1 represents hydrogen and

X_2 represents alkyl having from 8 to 18 carbon atoms,

or

X_1 & X_2 represent the same or different alkyl or alkoxyalkyl wherein X_1 and X_2 must together contain from 8 to 36 carbon atoms,

or

X_1 represents cyclohexyl or cyclohexyl substituted by lower alkyl, and

X_2 represents alkyl of 1 to 18 carbon atoms, alkyl of 1 to 18 carbon atoms substituted by a member selected from the group consisting of hydroxyl, lower alkoxy, lower alkenyloxy and cyano, lower alkenyl, cyclohexyl or cyclohexyl substituted by lower alkyl.

3,974,161
FUSED PYRIMIDIN-4(3H)-ONES AS ANTIALLERGY AGENTS

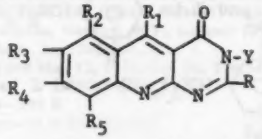
Thomas H. Althuis, Groton; Leonard J. Czuba, New London; Hans-Jurgen E. Hess, Old Lyme, and Saul B. Kadin, New London, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 444,138, Feb. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 351,025, April 13, 1973, abandoned. This application July 5, 1974, Ser. No. 485,945

Int. Cl.² C07D *471/04*

U.S. Cl. 260—256.4 F **9 Claims**

1. A compound selected from the group consisting of



and the pharmaceutically acceptable cation salts thereof wherein R is selected from the group consisting of methyl, ethyl, acetyl and COR^o wherein

R^o is selected from the group consisting of hydroxy, alkoxy having 1 to 4 carbon atoms, hydroxyalkoxy having 2 to 4 carbon atoms, amino and hydroxyamino;

Y is selected from the group consisting of (a) hydrogen, and (b) alkyl having 1 to 4 carbon atoms, carbalkoxyalkyl having 2 to 5 carbon atoms in the carbalkoxy moiety and 1 to 4 carbon atoms in the alkyl moiety, carboxyalkyl having 1 to 4 carbon atoms in the alkyl moiety, $-(CH_2)_m-O-CO-C_6H_5$ and $-(CH_2)_m-O-CO$-alkyl having 1 to 4 carbon atoms in the alkyl moiety; with the provisos that when R is methyl or ethyl, Y is selected from group (b); and when R is COR^o wherein R^o is amino or hydroxyamino, Y is hydrogen; m is an integer from 2 up to and including 4;

R_1 is selected from the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms and phenyl;

each of R_2, R_3, R_4 and R_5 is selected from the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, halo, benzyloxy, hydroxyl, thiol, alkanoyloxy having 1 to 4 carbon atoms, benzylthio, benzoyloxy, benzylsulfinyl, methylthio and methylsulfinyl; and

R_2 and R_3, and R_3 and R_4 when taken together are selected from the group consisting of methylenedioxy and ethylenedioxy.

3,974,162
4-PYRIMIDINYLTHIOACETIC ACID DERIVATIVES

Arthur A. Santilli, Havertown; Anthony C. Scotese, King of Prussia, and Rudolph R. Tomarelli, Phoenixville, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

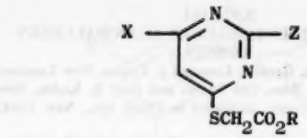
Filed Dec. 21, 1972, Ser. No. 317,343

The portion of the term of this patent subsequent to June 4, 1991, has been disclaimed.

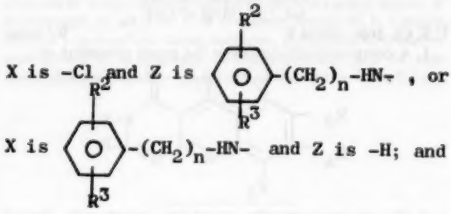
Int. Cl.² C07D *239/38*

U.S. Cl. 260—256.5 R **4 Claims**

1. A compound of the formula:



in which



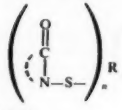
R is -H or lower alkyl; wherein
R^2 is -H or lower alkyl;
R^3 is lower alkyl or —Cl; and
n represents one of the integers 0 and 1.

3,974,163
POLY(THIOMAIDES)

Aubert Yaucher Coran, and Joseph Edward Kerwood, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 113,633, Feb. 8, 1971, Pat. No. 3,775,428, which is a continuation-in-part of Ser. No. 80,815, Oct. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 704,186, Sept. 20, 1967, abandoned, which is a division of Ser. No. 646,202, June 15, 1967, abandoned, which is a continuation-in-part of Ser. No. 579,493, Sept. 15, 1966, abandoned, and a continuation-in-part of Ser. No. 549,730, May 12, 1966, abandoned, and a continuation-in-part of Ser. No. 459,466, May 27, 1965, abandoned, said Ser. No. 80,815, is a division of Ser. No. 704,186, Sept. 20, 1967, abandoned.
This application June 25, 1973, Ser. No. 373,134
Int. Cl.² C07D *211/96, 207/48, 223/10, 225/02*
U.S. Cl. 260—281 GP **12 Claims**

1. A compound of the formula



wherein

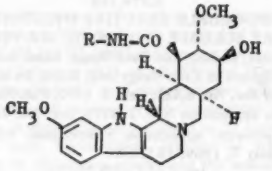
is succinimido, adipimido, glutarimido, 3,3-dimethylglutarimido, tetrapropenylsuccinimido, methylsuccinimido, octadecylsuccinimido, n-decenylsuccinimido, maleimido, citraconimido, glutaconimido, and hydrochelidonimido, *n* is 2, 3 or 4 equal to the valence of R and R is selected from the group consisting of radical from removing *n* hydrogens from alkane of 1 to 23 carbon atoms provided when *n* is 3 or 4 alkane contains at least *n* carbon atoms, radical from removing *n* hydrogens from cycloalkane of 5–15 carbon atoms, radical from removing *n*−1 hydrogens from phenyl, naphthyl, or phenyl mono- or di-substituted by lower alkyl, lower alkoxy, nitro or chloro, diphenylene, $C_2H_4(OOCCH_2CH_2—)_2$, $CH_3C(CH_2OOCCH_2—)_3$, $C_2H_5C(CH_2OOCCH_2—)_3$, $CH_3CH_2C(CH_2OOCCH_2CH_2—)_3$, $CH_3CH_2C(CH_2OOCCH_2—)_3$, $C(CH_2OOCCH_2CH_2—)_4$, and $C(CH_2OOCCH_2—)_4$.

3,974,164
RESERPIC ACID DERIVATIVES

Marguerite Severine LaRoche Navarron, Levallois-Perret, France, assignor to Serdex-Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation, Puteaux, France

Filed July 22, 1974, Ser. No. 490,509
Claims priority, application United Kingdom, Aug. 2, 1973, 36820/73
Int. Cl.² C07D *401/04*
U.S. Cl. 260—287 A **4 Claims**

1. A compound selected from the group consisting of the compounds having the formula:



(I)

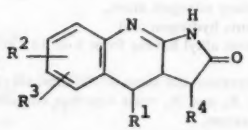
in which R is selected from the group consisting of the radicals of formula —NHR_1, —NH—$COOR_2$, —NH—CO—R_3, —NH—CO—NH—Ar, —NH—CS—NH—Ar and —N=CH—Ar in which:
R_1 is hydrogen,
R_2 is selected from the group consisting of lower alkyl and phenyl,
R_3 is selected from the group consisting of phenyl, phenyl mono-, di-, and tri-substituted by radicals selected from the group consisting of lower alkoxy and hydroxy, and
Ar is selected from the group consisting of phenyl, phenyl mono-, di-, and tri-substituted by radicals selected from the group consisting of lower alkoxy and nitro, and their pharmaceutically acceptable addition salts with inorganic or organic acids.

3,974,165
HYPOTENSIVE AGENTS

Richard Anthony Partyka; Henry Michael Holava, both of Liverpool, and Warren Neil Beverung, Minoa, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 441,619, Feb. 21, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,593
Int. Cl.² C07D *215/38, 215/58*
U.S. Cl. 260—287 CF **19 Claims**

1. A compound having the formula



in which R^1 and R^4 are alike or different and each is H, phenyl or (lower)alkyl of 1 to 3 carbon atoms, R^2 and R^3 when different are hydrogen, chloro, bromo, fluoro, CF_3, hydroxy, nitro, amino, phenyl, (lower)alkyl of 1 to 3 carbon atoms, or (lower-)alkoxy of 1 to 3 carbon atoms, R^2 and R^3 when alike are hydrogen, chloro, fluoro, bromo, hydroxy, (lower)alkyl of 1 to

3 carbon atoms, or (lower)alkoxy of 1 to 3 carbon atoms or when taken together R^2 and R^3 are methylenedioxy or the residue of a phenyl ring (—C=CH—CH=CH—); or a pharmaceutically acceptable salt thereof.

3,974,166
PROCESS FOR THE MANUFACTURE OF BROMOPYRIDINES

Francis Mutterer, St. Louis, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 17, 1974, Ser. No. 479,920
Claims priority, application Switzerland, July 10, 1973, 10020/73
Int. Cl.² C07D 213/26, 213/48, 213/61, 213/02
U.S. Cl. 260—290 HL 2 Claims

1. A compound selected from the group consisting of 2,6-dibromo-3-chloropyridine, 2,6-dibromo-3-bromomethyl-5-chloropyridine, 2,6-dibromo-3-bromomethyl-5-nitropyridine, 2,6-dibromonicotinic acid, 2,6-dibromo-5-chloronicotinic acid, 2,6-dibromo-3-trifluoromethylpyridine and 2,6-dibromo-3-chloro-5-aminopyridine.

3,974,167
(7-NITRO-2-AZA-9-FLUORENYLIDENE) MALONONITRILE

Mitsuru Hashimoto, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Division of Ser. No. 326,563, Jan. 24, 1973, Pat. No. 3,867,140. This application Dec. 30, 1974, Ser. No. 537,405
Claims priority, application Japan, Jan. 24, 1972, 47-9293
Int. Cl.² C07D 221/06
U.S. Cl. 260—294.9 1 Claim

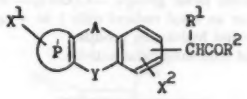
1. (7-Nitro-2-aza-9-fluorenylidene) malononitrile.

3,974,168
TRICYCLE SUBSTITUTED ACETONES

Michio Nakanishi; Takanori Oe, both of Nakatsu, and Mineo Tsuruda, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Sept. 4, 1974, Ser. No. 503,207
Claims priority, application Japan, Sept. 4, 1973, 48-99828; Nov. 5, 1973, 48-124840
Int. Cl.² C07D 487/00, 491/92
U.S. Cl. 260—295 T 23 Claims

1. A compound of the formula:



wherein each of X^1 and X^2 is a hydrogen atom, a halogen atom or an alkyl group having 1 to 4 carbon atoms;

R^1 is a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 2 to 4 carbon atoms, an alkynyl group having 2 to 4 carbon atoms or a group $-B^1-R^3$ (wherein B^1 is an alkylene group having 1 to 4 carbon atoms, and R^3 is a carboxyl group, an alkoxycarbonyl group in which the alkoxy moiety has 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms or a di-alkyl-amino group in which each alkyl moiety has 1 to 4 carbon atoms);

R^2 is an alkyl group having 1 to 4 carbon atoms or a group $-B^2-R^4$ wherein B^2 is an alkylene group having 2 to 4 carbon atoms, and R^4 is a carboxyl group or a di-alkyl-amino group in which each alkyl moiety has 1 to 4 carbon atoms);

A is a methylene group or a carbonyl group;

Y is an oxygen atom, a sulfur atom or an alkyl-imino group in which the alkyl moiety has 1 to 4 carbon atoms; and

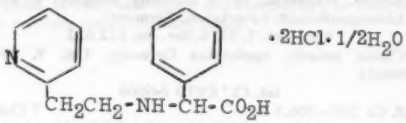
ring P is a pyridine ring; and a pharmaceutically acceptable salt thereof.

3,974,169
α-[2-(2-PYRIDYL)ETHYLAMINO]PHENYLACETIC ACID DIHYDROCHLORIDE HEMIHYDRATE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 12, 1975, Ser. No. 576,344
Int. Cl.² C07D 213/04
U.S. Cl. 260—295 R 1 Claim

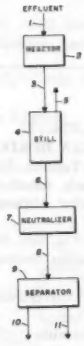
1. A compound of the formula:



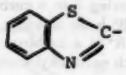
3,974,170
PREPARATION OF 2-MERCAPTOAZOLES

Robert Henry Campbell, Akron, and Alfred Bay Sullivan, Wadsworth, both of Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 26, 1974, Ser. No. 500,461
Int. Cl.² C07D 277/72
U.S. Cl. 260—306 21 Claims



1. A process for preparing 2-mercaptoazoles or salts thereof which comprises reacting hydrogen sulfide or hydrogen sulfide precursor and an azole-2-sulfonate of the formula A—SO_n—R to obtain 2-mercaptoazoles of the formula A—S—R in which in each occurrence, A is



or said benzothiazolyl radical substituted on the ortho arylene ring by a member of the group consisting of lower alkyl, halo, nitro, hydroxy, carbomethoxy, carbethoxy, acetyl, lower alkoxy and phenyl, *n* is 2 or 3 and R is hydrogen or salt cation.

3,974,171

O-[3-METHYL-1,3,4-TRIAZOLE-(2,3,-b)-THIAZOL-(6)YL]-(THIONO)-PHOSPHORIC(PHOSPHONIC) ACID ESTERS

Hellmut Hoffmann, Wuppertal; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbrueck, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

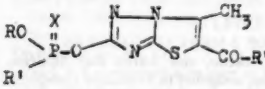
Filed Oct. 7, 1974, Ser. No. 512,632

Claims priority, application Germany, Oct. 9, 1973, 2350631

Int. Cl.² C07D *249/00*

U.S. Cl. 260—306.7 E **7 Claims**

1. An O-[3-methyl-1,3,4-triazole-(2,3-b)-thiazol(6)yl]-(thiono)-phosphoric(phosphonic) acid ester of the formula



(I)

in which

R is alkyl with 1 to 6 carbon atoms,

R′ is alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 6 carbon atoms,

R″ is amino, monoalkylamino or dialkylamino with 1 to 4 carbon atoms in the or each alkyl moiety or alkoxy with 1 to 6 carbon atoms, and

X is oxygen or sulfur.

3,974,172

BENZOFURAN DERIVATIVES

Wilfried Sahm, Keikheim, Taunus; Erich Schinzel, Hofheim, Taunus, and Gunter Rosch, Altenhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

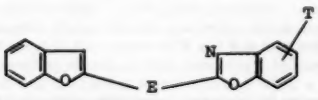
Filed Feb. 6, 1974, Ser. No. 440,013

Claims priority, application Switzerland, Feb. 9, 1973, 1879/73

Int. Cl.² C07D *263/56*

U.S. Cl. 260—307 D **2 Claims**

1. A compound of the formula



wherein E is p-phenylene and T is selected from the group consisting of 5-(β-dimethylamino)-carboethoxy and 5-(β-trimethylammonium)-carbo-ethoxy methosulfate.

3,974,173

OXAZOLIDINES OF ENDO-6-FORMYL-EXO-3-HYDROXYBICYCLO[3.1.0]-HEXAN-EXO-2-ACETIC ACID, δ-LACTONE

Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 315,365, Dec. 15, 1972, abandoned, which is a division of Ser. No. 181,246, Sept. 16, 1971, Pat. No. 3,711,515, which is a continuation-in-part of Ser. No. 93,483, Nov. 27, 1970, abandoned. This application Apr. 23, 1975, Ser. No. 570,670

Int. Cl.² C07D *263/06*

U.S. Cl. 260—307 FA **2 Claims**

1. An oxazolidine, which is (1R, 2S, 2′S, 3R, 4′S, 5R, 5′R, 6R)-3-hydroxy-6-(3′,4′-dimethyl-5′-phenyl-2′-oxazolidinyl)-bicyclo[3.1.0]hexane-2-acetic acid, γ-lactone, represented by formula II.

2. An oxazolidine, which is (2S, 2R, 2′R, 3S, 4′R, 5S, 5′S, 6S)-3-hydroxy-6-(3′,4′-dimethyl-5′-phenyl-2′-oxazolidinyl)-bicyclo[3.1.0]hexane-2-acetic acid, γ-lactone, represented by formula III.

3,974,174

1-(1,2,4-TRIAZOLYL-1′)-2-PHENOXY-4,4-DIMETHYL-PENTAN-3-ONES

Karl Heinz Buchel; Wolfgang Kramer, both of Wuppertal, and Paul-Ernst Frohberger, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

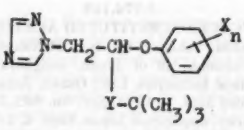
Filed June 27, 1974, Ser. No. 483,758

Claims priority, application Germany, July 10, 1973, 2335020

Int. Cl.² C07D *249/08*

U.S. Cl. 260—308 R **6 Claims**

1. A 1-ethyl-triazole of the formula



in which

n is an integer from 0 to 3,

X is fluorine, chlorine, bromine, halogenalkyl with 1 or 2 carbon atoms and 2 to 5 halogen atoms, straight-chain or branched alkyl with 1 to 4 carbon atoms, alkyoxy or alkylthio with 1 to 4 carbon atoms, alkylsulfonyl with 1 to 4 carbon atoms or phenyl, and

Y is a keto group or a functional derivative of a keto group selected from ketal groups $-C(OR)_2-$ wherein R is hydrogen or an alkyl radical with 1 to 4 carbon atoms, and oxime and hydrazone groups,

or a salt thereof with fungicidal activity.

3,974,175

NITRO-CHROMENO PYRAZOLE COMPOUNDS THEIR MANUFACTURE AND USE

Robert Garner, Bury, England, and Jean Claude Petitpierre, Kaiseraugst, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

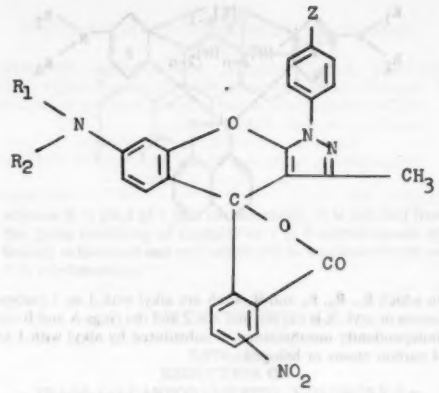
Filed Aug. 19, 1974, Ser. No. 498,687

Claims priority, application United Kingdom, Sept. 6, 1973, 41964/73; Switzerland, July 30, 1974, 10475/74

Int. Cl.² C07D *405/14*

U.S. Cl. 260—310 R **4 Claims**

1. An isomeric mixture of chromenopyrazoles of the formula



wherein

R_1 and R_2 independently of the other represent alkyl of 1 to 4 carbon atoms or benzyl

Z represents hydrogen, methyl or an amino group mono- or disubstituted by alkyl of 1 to 4 carbon atoms, alkanoyl of 2 to 4 carbon atoms or by benzyl.

3,974,176

HALOGEN PYRAZOLES DERIVATIVES, A METHOD FOR PRODUCING THESE HALOGEN PYRAZOLE DERIVATIVES AND MEDICAMENTS CONTAINING THEM

Georg Rainer, Constance, Germany, assignor to Byk-Gulden Lomberg Chemische Fabrik GmbH, Germany

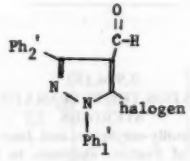
Division of Ser. No. 497,380, Aug. 14, 1974, abandoned. This application Aug. 5, 1975, Ser. No. 602,071

Claims priority, application Luxemburg, Aug. 16, 1973, 68238

Int. Cl.² C07D *231/10*; A61K *31/415*

U.S. Cl. 260—310 R **3 Claims**

1. A compound of the formula



wherein

Ph_1' denotes phenyl;

Ph_2' denotes phenyl, halophenyl, p-(lower alkoxy)phenyl or p-(lower alkyl)phenyl; anad

halogen denotes bromo.

3,974,177

PROCESS FOR THE PURIFICATION OF CRUDE POLYHALO COPPER PHTHALOCYANINES

Friedrich Ische, Naurod, Taunus, and Ernst Spietschka, Oberauroff, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 15, 1975, Ser. No. 605,061

Claims priority, application Germany, Aug. 17, 1974, 2439599

Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **8 Claims**

1. A process for purifying a polyhalo copper phthalocyanine which comprises treating a crude polyhalocopper phthalocyanine with sulfuric acid of a strength to yield a sulfuric acid concentration at the beginning of the process of 90 to 100% by weight in an amount to provide for mixability of the reaction system and 0.05 to 1 mol per mol of polyhalo copper phthalocyanine of an inorganic peroxo compound or an inorganic peroxo addition compound at a temperature of 20° to 120°C, if necessary, diluting with water or dilute sulfuric acid to reach a sulfuric acid concentration of from 80 to 90% by weight to precipitate the sulfate of the polyhalo copper phthalocyanine, isolating said sulfate and hydrolizing it to yield the pure polyhalo copper phthalocyanine.

3,974,178

NAPHTHOSTYRIL CATIONIC DYES

Masaaki Ohkawa, Takatsuki; Seizo Konishi, Minoo; Kazuyoshi Hirabayashi, Takarazuka; Sadaharu Abeta, Toyonaka; Tetsuo Okaniwa, Minoo, and Yoshiro Takeda, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

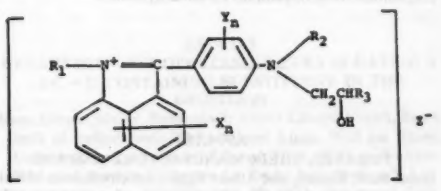
Filed Mar. 21, 1973, Ser. No. 343,336

Claims priority, application Japan, Mar. 25, 1972, 47-30109

Int. Cl.² C07D *209/92*

U.S. Cl. 260—326.5 B **5 Claims**

1. A compound of the formula



wherein R_1 is β-C_1–C_2 alkoxy substituted ethyl, R_2 is C_1–C_4 alkyl or phenyl substituted by one C_1–C_2 alkoxy, R_3 is C_1–C_4 alkyl or C_1–C_2 alkyl substituted by one C_1–C_4 alkoxy,

X is hydrogen or halogen,
Y is hydrogen, a C_1–C_2 alkyl or a halogen, *n* is an integer of from 1 to 2, and Z^- is an anion.

3,974,179

1,3,4,9-TETRAHYDROPYRANO[3,4-B]INDOLE-1-ACETAMIDES AND DERIVATIVES

Christopher A. Demerson, Montreal; Leslie G. Humber; Thomas A. Dobson, both of Dollard des Ormeaux, and Ivo L. Jirkovsky, Montreal, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

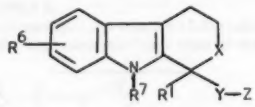
Continuation-in-part of Ser. No. 311,023, Nov. 30, 1972, abandoned, which is a continuation-in-part of Ser. No. 289,714, Sept. 15, 1972, which is a continuation-in-part of Ser. No. 148,895, June 1, 1971, Pat. No. 3,843,681. This application Oct. 10, 1974, Ser. No. 513,693

The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.

Int. Cl.² C07D *209/32*

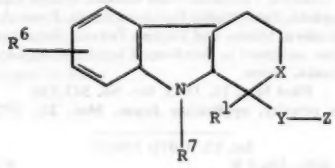
U.S. Cl. 260—326.28 **23 Claims**

1. A compound of the formula



wherein R^1 is lower alkyl having from 1 to 6 carbon atoms; R^6 is hydrogen or methoxy; R^7 is hydrogen or lower alkyl having from 1 to 6 carbon atoms; X is oxy or thio, Y is CO, CH_2CO or CH_2CH_2CO and Z is amino, methylamino, dimethylamino, diethylamino or phenylamino.

2. A compound of the formula



wherein R^1 is lower alkyl having from 1 to 6 carbon atoms; R^6 is hydrogen, chlorine, methyl or benzyloxy; R^7 is hydrogen or lower alkyl having from 1 to 6 carbon atoms; X is oxy; Y is CH_2CO or CH_2CH_2CO and Z is amino, methylamino, ethylamino, isopropylamino or dimethylamino.

3,974,180

FURANES, THEIR MANUFACTURE AND USE

Heinz Balli, Riehen, and Albert Egger, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

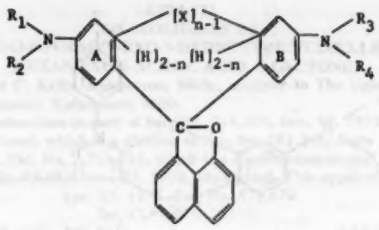
Filed Nov. 18, 1974, Ser. No. 524,850

Claims priority, application Switzerland, Nov. 27, 1973, 16635/73

Int. Cl.² C07D *493/10*

U.S. Cl. 260—335 **3 Claims**

1. A furane of the formula



in which R_1, R_2, R_3 and R_4 each are alkyl with 1 to 4 carbon atoms or aryl, X is oxygen and *n* is 2 and the rings A and B are independently unsubstituted or substituted by alkyl with 1 to 4 carbon atoms or halogen.

3,974,181

TRIMETHYL-1,4-DIOXASPIRO[4,5]DEC-7-EN-8-METHANOL

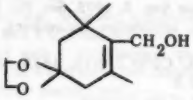
Joseph Donald Surmatis, and Armin Walser, both of West Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 325,690, Jan. 22, 1973, Pat. No. 3,879,424, which is a division of Ser. No. 163,436, July 16, 1971, Pat. No. 3,732,214, which is a division of Ser. No. 55,565, July 19, 1970, Pat. No. 3,661,997, which is a division of Ser. No. 617,787, Feb. 23, 1967, Pat. No. 3,558,712. This application Jan. 6, 1975, Ser. No. 538,621

Int. Cl.² C07D *317/10*

U.S. Cl. 260—340.9 **1 Claim**

1. A compound of the formula:



3,974,182

INTERMEDIATES FOR THE PREPARATION OF TRIENIC STEROIDS

Julien Warnant, Neuilly-sur-Seine, and Jean Jolly, Fontenay-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France

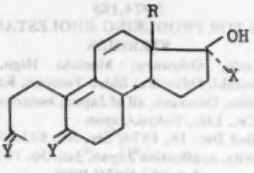
Division of Ser. No. 400,170, Sept. 24, 1973, Pat. No. 3,910,961, which is a division of Ser. No. 213,731, Dec. 29, 1971, Pat. No. 3,781,311. This application June 25, 1975, Ser. No. 590,267

Claims priority, application France, Mar. 19, 1971, 71.09709

Int. Cl.² C07D *317/72*

U.S. Cl. 260—340.9 **2 Claims**

1. A compound of the formula



wherein R is alkyl of 1 to 4 carbon atoms, X is selected from the group consisting of aliphatic of 1 to 6 carbon atoms optionally substituted and cycloalkyl of 3 to 6 carbon atoms and Y is ethylenedioxy.

3,974,183

REDUCTION OF TRANS-1-(2-CARBOXYMETHYL-3-HYDROXY-5-p-PHENYLBENZOYLOXYCYCLOPENTYL)-1-OCTEN-3-ONE-γ-LACTONE

Elias J. Corey, Pfizer Inc., 235 E. 42nd St., New York, N.Y. 10017

Division of Ser. No. 324,511, Jan. 17, 1973, Pat. No. 3,867,460, which is a continuation-in-part of Ser. No. 117,748, Feb. 22, 1971, abandoned. This application July 12, 1974, Ser. No. 487,885

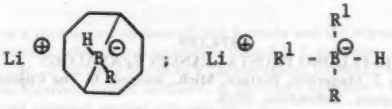
Int. Cl.² C07D *307/00*

U.S. Cl. 260—343.3 R **9 Claims**

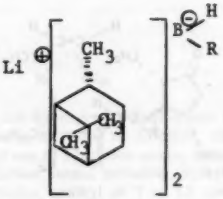
1. A process for the reduction of trans-1-(2-carboxymethyl-3-hydroxy-5-p-phenylbenzoyloxycyclopentyl-1-octen-3-one-γ-lactone to the corresponding 3-ol which comprises the step of contacting said 3-one in an inert solvent under an inert atmosphere at between about −50° and −150°C. with at least about equimolar proportions of a Lewis base which suppresses competing C=C reductions and a borohydride selected from the group consisting of:

lithium 2-thexyl-8-methyl-2-borabicyclo/3,3,1/nonylhydride;

lithium perhydro-9b-borophenalylhydride;



and



wherein R^1 is cycloalkyl having from 5 to 6 carbon atoms and R is alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 5 to 6 carbon atoms or phenyl until said 3-one is substantially reduced to said 3-ol.

3,974,184

MICROBIAL PRODUCTION OF CERTAIN ISOFLAVONES

Hamao Umezawa; Tomio Takeuchi; Hideo Chimura, all of Tokyo; Tsutomu Sawa, Ayase, and Masa Hamada, Hoya, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

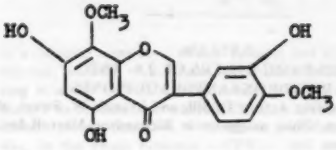
Filed July 23, 1974, Ser. No. 490,839

Claims priority, application Japan, Aug. 1, 1973, 48-85884

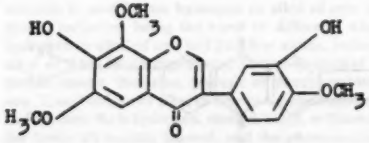
Int. Cl.² C07D *311/36*

U.S. Cl. 260—345.2 **3 Claims**

1. A compound having the formula



or



3,974,185

HEXAHYDRO-CYCLOPENTANO[B]FURANS HAVING A 2-C = C CONTAINING SUBSTITUENT IN THE 4-POSITION

Hans Johann Mayer, Fullinsdorf; Albert Eduard Fischli, Basel, both of Switzerland; Michael Josef Klaus, Weil am Rhein, Germany, and Alexander Eduard Wick, Riehen, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 374,850, June 29, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,127

Claims priority, application Switzerland, July 6, 1972, 10120/72

Int. Cl.² C07D *307/93*

U.S. Cl. 260—346.2 R **6 Claims**

1. A compound of the formula:

wherein R^1 is lower alkyl; R^2 is selected from the group consisting of hydroxy, tetrahydropyranyloxy, 4-methoxy-5, 6-dihydro-2-H-pyranyloxy, benzyloxy, trityloxy, benzhydryloxy, alphaloweralkoxyloweralkoxy, trimethylsilyloxy, and hydroxy-protected as its ester, said ester being hydrolyzable and derived from phosphoric acid, lower alkanoic acid, aryl lower alkanoic acid, carbonic acid, and lower alkane dicarboxylic acid; and R^3 is hydrogen, an alkyl group of from 1–10 carbon atoms, a cycloalkyl group of from 3–7 carbon atoms, an alkenyl group of from 2–10 carbon atoms, phenyl, (lower alkyl)-phenyl or nitrophenyl.

3,974,186

BIS-BASIC ETHERS OF 2,6- AND 2,7-DIHYDROXYANTHRAQUINONES

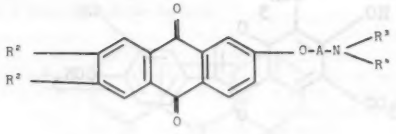
Robert W. Fleming; Arthur D. Sill, and Francis W. Sweet, all of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Continuation of Ser. No. 37,312, May 14, 1970, abandoned. This application Sept. 5, 1973, Ser. No. 394,584

Int. Cl.² C07C *97/26*; C09B *1/50*

U.S. Cl. 260—380 **4 Claims**

1. A compound selected from a base of the formula



or a pharmaceutically acceptable acid addition salt of said base, wherein one R^2 is a hydrogen atom and the other R^2 is the radical A is a straight chain alkylene group having 2 or 3 carbon atoms and each R^3 and R^4 is a hydrogen atom or an alkyl radical having 1 to 3 carbon atoms.

3,974,187

SYNTHETIC ANALOGS HAVING THE ACTIVITY OF NATURALLY OCCURRING FORMS OF COENZYME Q

Yieh-Ping Wan, 1100 Reinli, Apt. 209, Austin, Tex. 78723, and Karl Folkers, 6406 Mesa Drive, Austin, Tex. 78731

Filed Feb. 28, 1975, Ser. No. 553,927

Int. Cl.² C07C *49/73*

U.S. Cl. 260—396 R **8 Claims**

1. 6-Alkenyl-2,3-dimethoxy-5-methyl-1,4-benzoquinones where the 6-alkenyl groups are n-(8′-pentadecenyl), n-(8′-heptadecenyl), n-(8′, 11′-heptadecadienyl), n-(8′, 11′, 14′-heptadecatrienyl), n-(10′-nonadecenyl), n-(10′, 13′-nonadecadienyl), and n-(10′, 13′, 16′-nonadecatrienyl).

3,974,188

PROCESS FOR PRODUCING CHOLESTANE TYPE STEROIDS

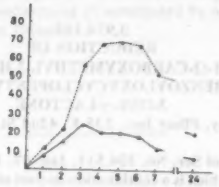
Toshihiro Kudo, Odawara; Moriaki Higo, Hiratsuka; Kazuhiko Suzaki, Odawara; Shiro Tomono, Kanagawa, and Masafu Shinbo, Odawara, all of Japan, assignors to The Lion Dentifrice Co., Ltd., Tokyo, Japan

Filed Dec. 18, 1974, Ser. No. 533,834

Claims priority, application Japan, Jan. 30, 1974, 49-11760

Int. Cl.² C07C *9/00*

U.S. Cl. 260—397.2 **12 Claims**



1. A process for producing cholestanyl phosphate, epicholestanyl phosphate or salts thereof which comprises reacting a phosphorylating agent with a solution of cholestanol or epicholestanol and a tertiary amine in an inert solvent at 0°C ~ −80°C, whereby the hydroxyl group at the three-position of cholestanol or epicholestanol is converted to the corresponding phosphate ester and hydrolyzing or hydrogenating said phosphate ester.

3,974,189

16-FLUORO PROSTAGLANDIN E_2 ANALOGS

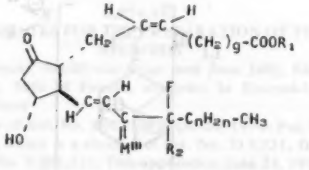
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,691

Int. Cl.² C07C *61/38*, *69/74*

U.S. Cl. 260—408 **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein g is an integer from 2 to 5, inclusive; wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, in the chain between $—CFR_2—$ and terminal methyl; wherein M‴ is

or

wherein R_7 and R_8 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,190

16-FLUORO PROSTAGLANDIN A_1 ANALOGS

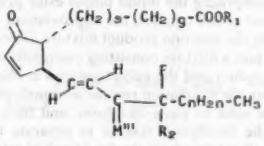
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,690

Int. Cl.² C07C *61/38*, *69/74*

U.S. Cl. 260—408 **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, in the chain between $—CFR_2—$ and terminal methyl; wherein M''' is

or

wherein R_7 and R_8 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2 or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,191

16-FLUORO PROSTAGLANDIN F_1 ANALOGS

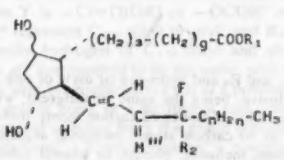
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,695

Int. Cl.² C07C *61/38*, *69/74*

U.S. Cl. 260—408 **19 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein ~ indicates attachment of hydroxyl to the ring in alpha or beta configuration; wherein *g* is an integer from 2 to 5, inclusive; wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, in the chain between $—CFR_2—$ and terminal methyl; wherein M''' is

or

wherein R_7 and R_8 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,192

16-FLUORO PROSTAGLANDIN B_1 ANALOGS

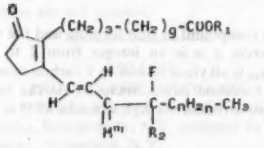
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,696

Int. Cl.² C07C *61/38*, *69/74*

U.S. Cl. 260—408 **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one

to 6 carbon atoms, inclusive, in the chain between —CFR_2— and terminal methyl; wherein M''' is

or

wherein R_7 and R_8 and hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,193

16-FLUORO PROSTAGLANDIN B_2 ANALOGS

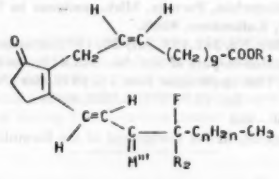
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,926

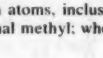
Int. Cl.² C07C *61/38, 69/74*

U.S. Cl. 260—408 **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is is an integer from 2 to 5, inclusive; wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, in the chain between —CFR_2— and terminal methyl; wherein M''' is



or

wherein R_7 and R_8 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,194

METHOD OF SEPARATING COBALT CATALYST FROM A LIQUID POLYOL ESTER PRODUCT

Hiroshi Isa, Funabashi; Takeo Inagaki, Yachiyo; Yasuhiro Kiyonaga, Musashino, and Masuzo Nagayama, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Sept. 30, 1974, Ser. No. 510,590

Claims priority, application Japan, Oct. 6, 1973, 48-112721

Int. Cl.² C09F *5/08*

U.S. Cl. 260—410.6 **14 Claims**

1. In a method of preparing liquid polyol esters of carboxylic acids which comprises reacting an olefin having 3 to 20 carbon atoms, with carbon monoxide and polyhydric alcohol, in the presence of a cobalt catalyst, to obtain a reaction product mixture comprising the liquid polyol ester product, unreacted olefin and cobalt catalyst, the improvement which comprises: distilling the reaction product mixture under conditions effective to retain a mixture consisting essentially of the liquid polyol ester product and the cobalt catalyst as the distillation residue, cooling the distillation residue to transform the cobalt catalyst into a solid or paste-like form, and then filtering or centrifuging the distillation residue to separate the solid or paste-like cobalt catalyst from the liquid polyol ester product.

3,974,195

2a,2b-DIHOMO-15-ALKYL-$PGF_{2\alpha}$ ANALOGS

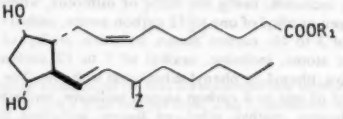
Gilbert A. Youngdale, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 2, 1974, Ser. No. 511,220

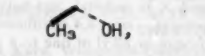
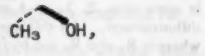
Int. Cl.² C07C *61/38, 69/74*

U.S. Cl. 260—410.9 R **7 Claims**

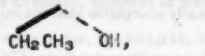
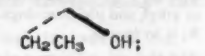
1. An optically active compound of the formula:



wherein Z is

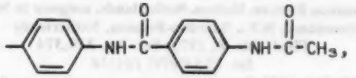



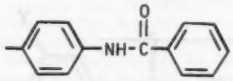
or

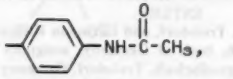



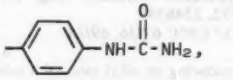
and

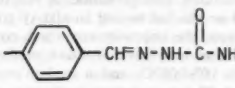
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive,

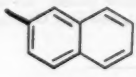












or pharmacologically acceptable salts thereof wherein R_1 is hydrogen.

3,974,196
METHOD FOR DISPROPORTIONATING ETHYLENICALLY UNSATURATED COMPOUNDS HAVING FUNCTIONAL ESTER GROUPS

Ryuichi Nakamura, Tokyo; Seiji Fukuhara, Yokkaichi; Shuichi Matsumoto, Yokohama, and Koei Komatsu, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1974, Ser. No. 527,433

Claims priority, application Japan, Nov. 28, 1973, 48-134171; July 29, 1974, 49-85987

Int. Cl.² C11C *3/02*

U.S. Cl. 260—410.9 R **12 Claims**

1. A method for disproportionating an ethylenically unsaturated compound or a mixture of ethylenically unsaturated compounds, which comprises:

reacting at a temperature from −30°C to +300°C a compound (1) having the formula:

$$R^1R^2C = CR^3X$$

wherein R^1 is hydrogen, $C_{1\text{-}15}$ alkyl, alkenyl or X; R^2 and R^3 are independently hydrogen or $C_{1\text{-}3}$ alkyl, and X is a group having the formula:

$$-(CR^4_2)_a Y \ (a \geq 1)$$

wherein Y is $-C(=O)OR^5$ or $-OCOR^6$ in which R^5 and R^6 represent $C_{1\text{-}15}$ alkyl or aryl; and R_4 represents principally hydrogen of $C_{1\text{-}15}$ alkyl and all of the R^4 groups are not required to be the same, with the proviso that no sites of unsaturation exist at a position conjugate to the double bond, or a mixture of said compound and a compound selected from the group consisting of 1,4-polybutadiene; 1,2-polybutadiene; a compound having the formula,

$$R^7R^8C = CR^8R^{10}$$

wherein R^7 and R^9 are hydrogen or $C_{1\text{-}3}$ alkyl and R^8 and R^{10} represent hydrogen, $C_{1\text{-}15}$ alkyl, aralkyl, aryl, or halohydrocarbon groups, with the proviso that no sites of unsaturation exist at a position conjugate to the double bond, or a cyclic compound having the formula,

wherein —Z— represents $-(CH_2)_b-$ or $-(CH_2)_c-CH=CH-(CH_2)_d-$ ($b \geq 1, c \geq 1, d \geq 1$), with a catalyst consisting essentially of a combination of (A) at least one member selected from the group consisting of the halides, oxyhalides, carbonyl complexes, alkoxides, oxyalkoxides and alkoxyhalides of tungsten, molybdenum, or rhenium with (B) at least one compound having the formula,

$$R_pAlX^1_{3-p}$$

wherein R represents alkyl, X^1 represents halogen, hydrogen, or —OR and p is a number from 1 to 3, wherein the components (A) and (B) are used in such a ratio that the atomic ratio Me/Al, wherein Me is W, Mo or Re, falls within the range from 1/1 to 1/15.

3,974,197
NEW COLOR COMPOSITION

Thomas Holden Parliment, New City, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,896

Int. Cl.² C07F *15/02*

U.S. Cl. 260—439 R **8 Claims**

1. A new yellow color composition consisting essentially of a ferric salt and combinations thereof complexed with at least an equimolar amount of an α-hydroxy carboxylic acid having at least one and no more than 2 carboxyl functions for each hydroxyl group with a degree of conjugation in all instances not exceeding three double bonds and water soluble derivatives of said hydroxy acids wherein the α-hydroxy and carboxyl functions are not reacted.

3,974,198
PROCESS FOR PRODUCING METHYLTRIACETOXYSILANE

Bruce A. Ashby, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,181

Int. Cl.² C07F *7/08*, *7/18*

U.S. Cl. 260—448.2 E **8 Claims**

1. An improved process for producing an acyloxysilane comprising reacting a compound of the formula,

R_nSiCl_{4-n}

with a compound selected from the class consisting of compounds of the formula,

R' COOH

and compounds of the formula,

$(R'CO)_2O$

in the presence of an iron complexing agent where R and R' are alkyl radicals of 1 to 8 carbon atoms and a varies from 1 to 3.

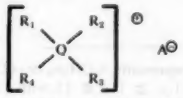
3,974,199

PROCESS FOR PRODUCTION OF CYCLOPROPYLCYANIDE

James H. Plonka, and R. Garth Pews, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 16, 1975, Ser. No. 587,013
Int. Cl.² C07C *120/04, 121/46*
U.S. Cl. 260—464 **9 Claims**

1. A process for the preparation of cyclopropylcyanide comprising reacting by contacting a γ--halobutyronitrile selected from the group consisting of 4-chlorobutyronitrile, 4-bromobutyronitrile, 4-iodobutyronitrile, and combinations thereof, with an alkali metal hydroxide in the presence of at least a trace amount of water and a catalytic amount of an onium salt of the formula



wherein: Q is a quaternized nitrogen or phosphorus atom, A^- is a neutralizing anion, and R_1-R_4 are hydrocarbyl groups of from 1 to about 16 carbon atoms each with a combined minimum total of about 10 carbon atoms, at an alkali metal hydroxide to γ-halobutyronitrile mole ratio of between about 1 to 1 and 1.5 to 1 and at a temperature at which the γ-halobutyronitrile, alkali metal hydroxide and onium salt are liquid.

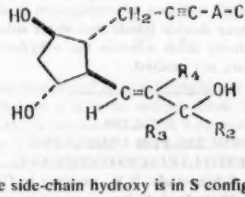
3,974,200

RACEMIC PROSTAGLANDINS OF THE 2-SERIES AND ANALOGS THEREOF

William P. Schneider, Kalamazoo Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 807,405, March 14, 1969, abandoned. This application Dec. 6, 1974, Ser. No. 530,434
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D **12 Claims**

1. A racemic compound of the combination of the formula:



wherein the side-chain hydroxy is in S configuration, and the mirror image of that formula; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 is $-(CH_2)_a-CH_3$ wherein a is 2, 3, 4, 5, or 6, or $-(CH_2)_d-X$ wherein d is zero, one, 2, 3, or 4 and X is isobutyl, tert-butyl, 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl; wherein R_3 and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein A is trimethylene or $-CH_2-Z-$ wherein Z is ethylene substituted with one or 2 fluoro, methyl, or ethyl; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,974,201

METHYL-N-(2-METHYL-PENTYLIDENE)-ANTHRANILATE FOR PERFUME AND FLAVORING COMPOSITIONS

Harmannus Boelens, Huizen, Netherlands, assignor to Naarden International, N.V., Naarden-Bussum, Netherlands

Filed Mar. 8, 1973, Ser. No. 339,374
Int. Cl.² C07C *101/54*
U.S. Cl. 260—471 R **1 Claim**

1. Methyl-N-(2-methylpentylidene)anthranilate.

3,974,202

METHOD OF PREPARING ARYLACETIC ACID ALKYL ESTERS

Moustafa El-Chahawi, Troisdorf, and Hermann Richtzenhain, Much-Schwellenbach, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Aug. 10, 1973, Ser. No. 387,268
Claims priority, application Germany, Aug. 17, 1972, 2240398; Aug. 17, 1972, 2240399
Int. Cl.² C07C *67/36, 69/76*
U.S. Cl. 260—476 R **6 Claims**

1. In a process of producing an alkyl ester of a substituted or unsubstituted arylacetic acid wherein a correspondingly substituted or unsubstituted benzyl halide is reacted with carbon monoxide and an alcohol having an alkoxy group the same as that of said ester, the improvement which comprises carrying out said reaction in a basic reaction medium at a temperature of about 10°–100°C, and a carbon monoxide pressure of about 0.1–25 atmospheres in the presence as catalyst of

which is at least one of $Co_2(CO)_8$ and $Fe(CO)_5$.

3,974,203

ESTERS OF HALOGENATED ALCOHOLS

Kenneth Rowland Dobson, Epsom Downs, England, assignor to BP Chemicals International Limited, England

Division of Ser. No. 387,951, Aug. 13, 1973, Pat. No. 3,890,375. This application Feb. 10, 1975, Ser. No. 548,555
Claims priority, application United Kingdom, Aug. 25, 1972, 39644/72
Int. Cl.² C07C *69/76, 69/78*
U.S. Cl. 260—476 R **3 Claims**

1. An ester of the general formula:

$Z(CH_2)_2.Z^1.CH_2.O.CO.R$

or

$Z(CH_2)_2.CH(Z).O.CO.R$

wherein

Z is $XCH_2.CHX-$,

Z^1 is $-CHX.CHX-$,

X is Cl or Br, and

R is a monovalent aromatic hydrocarbon radical which may be substituted by halogen or alkyl.

3,974,204

THIONOSALICYLIC ACID ANILIDES AND SALTS THEREOF

Jürgen Kurz, Wuppertal-Elberfeld; Heinrich Külling, Haan, Rhineland, and Manfred Feĝermann, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

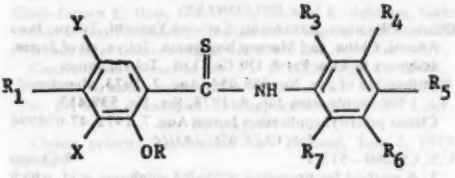
Division of Ser. No. 861,158, Sept. 25, 1969, Pat. No. 3,898,272, which is a continuation-in-part of Ser. No. 634,835, May 1, 1967, abandoned. This application Feb. 13, 1975, Ser. No. 549,682

Claims priority, application Germany, May 6, 1966, 49138; Aug. 17, 1966, 49965; Sept. 3, 1966, 50110

Int. Cl.² C07C *153/067*

U.S. Cl. 260—479 C 3 Claims

1. A thionosalicylic acid anilide of the formula:



wherein

R is lower alkyl carbamoyl,

R_1 is hydrogen or lower alkyl,

R_3, R_4, R_5, R_6 and R_7 are the same or different and are each hydrogen, lower alkyl, lower alkoxy, halogen, nitro, trifluoromethyl or lower alkylmercapto and

X and Y are the same or different, wherein X is halogen or nitro, and Y is hydrogen or halogen,

or a salt thereof with a non-toxic inorganic or organic base.

3,974,205

TETRACHLOROETHYL ESTERS OF UNSATURATED ORGANIC ACIDS AND THE METHOD FOR THEIR PREPARATION

Frantisek Hrabak; Milan Bezdek; Karel Bouchal, and Jan Lokaj, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

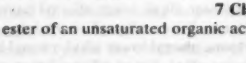
Filed Dec. 21, 1973, Ser. No. 427,430

Claims priority, application Czechoslovakia, Dec. 28, 1972, 9032-72; Dec. 28, 1972, 9031-72

Int. Cl.² C07C *69/62*

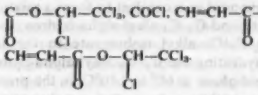
U.S. Cl. 260—485 H 7 Claims

1. A tetrachloroethyl ester of an unsaturated organic acid of the formula I



(I)

wherein X is a substituent selected from the group consisting of COOH, $COOCH_3$, $COOC_2H_5$,



and

3,974,206

PROCESS FOR THE THERMAL DECOMPOSITION OF THERMOPLASTIC RESINS WITH A HEAT TRANSFER MEDIUM

Takeichi Tatsumi, Tokyo; Katsuyoshi Ogawa, Omiya; Yutaka Tanaka, Fujisawa; Kazuo Ueno, and Shoji Daikoku, both of Hiratsuka, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Japan

Filed July 9, 1974, Ser. No. 482,797

Int. Cl.² C07C *69/54*

U.S. Cl. 260—486 R 11 Claims

1. A process for the production of decomposition products of thermoplastic resins which comprises:

1. contacting said resin with a fluid heat transfer medium, said medium comprising

a. an organic heat transfer medium having a melting point higher than the decomposition temperature of said thermoplastic resin but less than 500°C and

b. an inorganic heat transfer medium having a melting point of less than 500°C and a greater density than said organic heat transfer medium,

said organic heat transfer medium fully covering said inorganic heat transfer medium,

the contact between said thermoplastic resin and said fluid heat transfer medium being at a temperature sufficient to effect the decomposition of said thermoplastic resin and

2. recovering said decomposition products.

3,974,207

METHOD FOR PRODUCING METHACRYLIC ESTERS

Wieslaw Szelejewski, Kedzierzyn; Edward Grzywa, Warsaw; Jerzy Wojciechowski, Kedzierzyn; Kazimerz Fraczek; Zdzislaw Maciejewski, both of Kedzierzyn, and Boleslaw Kot, Oswiecim, all of Poland, assignors to Instyut Ciezkiej Syntesy Organiczej "Blachownia", Kedzierzyn, Poland

Filed July 9, 1974, Ser. No. 486,904

Claims priority, application Poland, July 12, 1973, 164042

Int. Cl.² C07C *67/30*, *69/54*

U.S. Cl. 260—486 D 2 Claims

1. A method of producing a C_1–C_4 alkyl methacrylate which comprises the steps of (1) oxidizing isobutyroldehyde to isobutyric acid with oxygen or an oxygen-containing gas in the liquid phase at 20° to 120°C. in the presence or absence of a catalyst to form isobutyric acid, (2) esterifying the isobutyric acid with a C_1–C_4 aliphatic alcohol at 50 to 100°C. in the presence of sulfuric acid as a catalyst to form the C_1–C_4 alkyl isobutyrate (3) oxidizing the C_1–C_4 alkyl isobutyrate in the liquid phase with oxygen or an oxygen-containing gas at 50° to 150°C. in the presence or absence of a catalyst to form the C_1–C_4 alkyl alpha-hydroxyisobutyrate and (4) dehydrating the C_1–C_4 alkyl alpha-hydroxyisobutyrate in the liquid phase at 60° to 140°C. in the presence of a sulfonated cation-exchange resin and a polymerization inhibitor to form the C_1–C_4 alkyl methacrylate.

2. A continuous method of producing a C_1–C_4 alkyl methacrylate which comprises simultaneously oxidizing a mixture of isobutyraldehyde and a C_1–C_4 alkyl isobutyrate in the liquid phase with oxygen or an oxygen-containing gas at a temperature of 20° to 120°C. in the presence or absence of a catalyst to form a mixture of isobutyric acid and C_1–C_4 alkyl alphahydroxyisobutyrate, recycling unreacted isobutyraldehyde and

C_1–C_4 alkyl isobutyrate to the initial reaction mixture, treating the mixture of isobutyric acid and C_1–C_4 alkyl alpha-hydroxyisobutyrate with a C_1–C_4 aliphatic alcohol at 50° to 100°C. in the presence of sulfuric acid as a catalyst to form a mixture of C_1–C_4 alkyl isobutyrate and C_1–C_4 alkyl alpha-hydroxy-isobutyrate, recycling the C_1–C_4 alkyl isobutyrate to the initial reaction mixture, dehydrating the C_1–C_4 alkyl alpha-hydroxyisobutyrate in the liquid phase at 60° to 140°C. in the presence of a sulfonated cation-exchange resin and a polymerization inhibitor to form the C_1–C_4 alkyl methacrylate and continuously introducing isobutyraldehyde into the initial reaction mixture.

3,974,208

AMPHOTERIC SURFACE-ACTIVE AGENTS

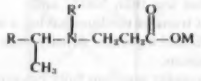
Zdzislaw W. Dudzinski, Clifton, N.J., and Reginald L. Wakeman, Paris, France, assignors to Millmaster Onyx Corporation, New York, N.Y.

Division of Ser. No. 594,550, July 9, 1975, which is a continuation-in-part of Ser. No. 429,681, Dec. 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,144, Dec. 14, 1970, abandoned. This application Jan. 19, 1976, Ser. No. 650,539

Int. Cl.² C07C *101/12*

U.S. Cl. 260—501.11 **2 Claims**

1. The compound substantially free from metal halide having the formula:



wherein R is a straight chain alkyl having from 6 to 16 carbon atoms, R′ is a lower alkyl, and M is selected from the group consisting of hydrogen, alkali metal, mono-, di-, or triethanolamine, and mono-, di-, or tri-propanolamine.

3,974,209

SUBSTITUTED TERTIARY AMINES AND PROCESSES FOR PREPARING THE SAME

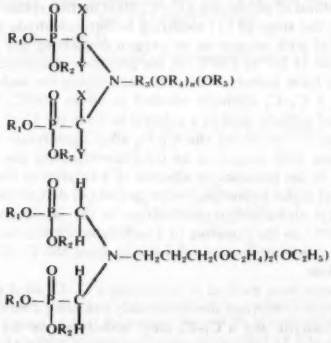
Robert S. Mitchell, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 169,131, Aug. 4, 1971, abandoned. This application Dec. 16, 1974, Ser. No. 532,963

Int. Cl.² C07F *9/38*

U.S. Cl. 260—502.5 **4 Claims**

1. A substituted tertiary amine having the general formula



wherein R_2 and R_2 are alike or unlike and are each independently selected from the group consisting of alkali metal ions, hydrogen and ammonium ions.

3,974,210

ALKYLPHENOL DISULFONATES OF IMPROVED COLOR BY NEUTRALIZING WITH STRONG CAUSTIC

Wilton H. Lind, Petaluma, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 285,715, Sept. 1, 1972, abandoned. This application July 3, 1975, Ser. No. 592,907

Int. Cl.² C07C *143/42*

U.S. Cl. 260—512 R **4 Claims**

1. A process for producing alkylphenol disulfonate based detergents of improved color which consists essentially of the steps of (1) sulfonating alkylphenol in which the alkyl group is substantially linear of 16 to 22 carbon atoms with a sulfonating agent until said product contains an average of from 1.5 to 2.0 sulfonic acid groups per molecule and (2) substantially neutralizing said product with an aqueous solution of an alkali metal hydroxide wherein the alkali metal hydroxide is present in the solution in an amount of at least 30% by weight.

3,974,211

METHOD OF MANUFACTURING METHALLYL SULFONATE

Osamu Okumura, Funabashi; Katsumi Yaguchi, Tokyo; Ikuo Adachi, Chiba, and Masuzo Nagayama, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 385,054, Aug. 2, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,413

Claims priority, application Japan, Aug. 7, 1972, 47-078996

Int. Cl.² C07C *143/16*

U.S. Cl. 260—513 T **7 Claims**

1. A method for preparing methallyl sulphonic acid, which comprises reacting sulfur trioxide with dimethyl sulfoxide, at a molar ratio of more than 0.8 mol of said dimethyl sulfoxide per 1 mol of sulfur trioxide, in the presence of a liquid solvent which is inert to isobutylene, to form a stable suspension of sulfur trioxidedimethyl sulfoxide complex in said solvent; and then reacting, in said solvent, at a temperature in the range of 10° to 80°C, said complex with isobutylene, at a molar ratio of 0.9 to 1.2 mols of isobutylene per 1 mol of sulfur trioxide in said complex, to produce a reaction product containing methallyl sulphonic acid.

3,974,212

[1-HYDROXIMINO-2,2-DISUBSTITUTED-5-INDANYLOXY-(OR THIO)]ALKANOIC ACIDS

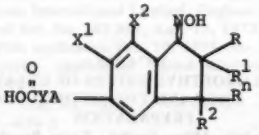
Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 22, 1974, Ser. No. 472,262

Int. Cl.² C07C *131/00*

U.S. Cl. 260—519 **18 Claims**

1. A compound of the formula:



wherein

A is oxygen or sulphur;

R is lower alkyl, cycloalkyl having from 3 to 6 carbon atoms, phenyl, or halo-, hydroxy-, lower alkoxy-, nitro or lower alkyl-substituted phenyl;

R^1 is lower alkyl, lower alkenyl having from 3 to 5 carbon atoms, lower alkynyl, containing from 3 to 5 carbon atoms, phenyl lower alkyl, phenyl lower alkenyl, hydroxy lower alkyl, lower alkoxy lower alkyl, oxo lower alkyl, hydroxy cycloalkyl having from 4 to 6 carbon atoms and cycloalkyl lower alkyl having 4 to 7 carbon atoms;

R and R^1 may be joined together with the carbon atom to which they are attached to form a cycloalkyl radical containing from 3 to 7 nuclear carbon atoms, or a hydroxy, or lower alkyl substituted cycloalkyl radical having from 3 to 7 nuclear carbon atoms;
R^2 is hydrogen, lower alkyl, phenyl, or lower alkyl substituted phenyl;
R^3 is hydrogen, or methyl;
R^1 and R^2 may be joined together to form a hydrocarbylene ring having up to 5 carbon atoms;
X^1 is hydrogen, methyl or halo; and
X^2 is methyl or halo; or
X^1 and X^2 may be joined to form a hydrocarbylene chain containing 3 to 4 carbon atoms; and
Y is alkylene or haloalkylene containing from 1 to about 4 carbon atoms, and the non-toxic pharmacologically acceptable salt derivatives thereof.

3,974,213

13,14-DIHYDRO-15-SUBSTITUTED-ω-PENTANORPROSTAGLANDINS

Hans-Jurgen E. Hess, Old Lyme; Michael R. Johnson, Gales Ferry; Jasjit S. Bindra, Groton, and Thomas K. Schaaf, Old Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

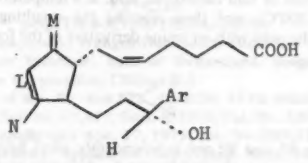
Continuation-in-part of Ser. No. 271,220, July 13, 1972, abandoned, and a continuation-in-part of Ser. No. 425,519, Dec. 17, 1973, abandoned. This application July 3, 1974, Ser. No. 485,491

Claims priority, application New Zealand, July 4, 1973, 171269

Int. Cl.² C07C *61/06, 61/20*

U.S. Cl. 260—520 B **5 Claims**

1. A compound of the structure:



wherein Ar is α- or δ-phenyl; 3,4-dimethoxylphenyl; 3,4-methylenedioxyphenyl; 3,4,5-trimethoxyphenyl; or monosubstituted phenyl wherein said substituent is halo, trifluoromethyl, phenyl, lower-alkyl or lower alkoxy;
L is a single bond or cis double bond;
M is =O or

N is hydrogen or α-hydroxyl;
and wherein L, M and N are so selected as to complete the structure of a prostaglandin of the A, F or E series.

3,974,214

ISOPHTHALIC ACID MANUFACTURE

G. Richard Worrell, Media; Alan R. Hirsig, Wallingford, and Henry R. Grane, Springfield, all of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 27, 1974, Ser. No. 443,642

Int. Cl.² C07C *51/33*

U.S. Cl. 260—524 R **6 Claims**

1. A continuous method of manufacturing isophthalic acid which comprises the steps of:
a. feeding to a first reactor system the combination of metaxylene and acetaldehyde, said first reactor system consisting essentially of a mixture of said metaxylene, acetaldehyde, a principal amount of aqueous acetic acid, isophthalic acid in both slurried and dissolved form, cobalt catalyst, and intermediate oxidation components and directing oxygen containing gas through said mixture, the components having an aromatic structure being designed as aromatic components, the unit molar ratio of acetic acid to aromatic components being maintained within a range from about 5 to about 30, the unit molar ratio of cobalt catalyst to aromatic components being maintained within a range from about 0.05 to about 5, and said first reactor being maintained at a pressure within a range from about 10 to 500 psig;
b. withdrawing from said first reactor system an interstage stream of said mixture for transfer to a second reactor system, said mixture consisting of solids suspended in a liquid portion;
c. feeding acetaldehyde to a second reactor system consisting essentially of a mixture of said acetaldehyde, aqueous acetic acid, isophthalic acid, cobalt catalyst, and intermediate oxidation products, said second reactor system containing from about one-tenth to about twice the volume of reaction mixture as said first reactor system and directing oxygen containing gas through said mixture for maintaining the second reactor system at a pressure within the range from about 10 to 500 psig;
d. withdrawing from said second reactor system a stream of said mixture for transfer to a system for recovery of isophthalic acid, the flow rate of such withdrawn product stream, expressed as moles of aromatic components per hour, being substantially the same as the flow rate to said second reactor;
e. regulating flow rates and volume of mixture in the first reactor to maintain average residence time of aromatic components in the first reactor within a range from about 1 hour to 10 hours, the average residence time in the second reactor being from one-fifth hour to 10 hours, the average residence time in the second reactor being from one-fifth hour to 10 hours, the total residence time being within the range from about 1.2 to about 20 hours;
f. controlling the temperature of each reactor system to be within the range from about 100°C. to 130°C.;
g. regulating the temperature to each reactor system and regulating the aromatic component flow rate to maintain in the first reactor a large molar ratio of isophthalic acid to metatoluic acid and to maintain the concentration of metatoluic acid below 2 weight percent of the liquid portion of the stream withdrawn from the first reactor system and to maintain in the second reactor a large molar ratio of iosphthalic acid to metatoluic acid and to maintain in the liquid portion of the stream withdrawn from the second reactor a concentration of metatoluic acid below 0.4 weight percent, whereby purified isophthalic acid adequately free from color-forming bodies can be withdrawn from said isophthalic acid recovery system.

3,974,215

PROCESS FOR DIRECTLY OBTAINING THE CALCIUM AND MAGNESIUM SALTS OF THE N-ACETYL-AMINO-6-HEXANOIC ACID FROM ACETYL-CAPROLACTAME

Jean Goulay, Oissel, France, assignor to Choay S.A., Paris, France

Filed Mar. 13, 1974, Ser. No. 450,732

Claims priority, application France, Mar. 13, 1973, 73.08871

Int. Cl.² C07C *102/00*

U.S. Cl. 260—534 R **18 Claims**

1. Process for preparing the calcium or magnesium salt of N-acetyl-amino-6-hexanoic acid which comprises reacting directly acetyl-caprolactam with calcium or magnesium hydroxide within an aqueous solution at a reactive temperature, and collecting a solution of the salt product.

3,974,216

PROCESS FOR RECOVERING AMMONIUM ORGANIC SALTS FROM AQUEOUS SOLUTIONS

Luigi Rivola, and Bruno Notari, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Filed Nov. 19, 1973, Ser. No. 417,357
Claims priority, application Italy, Nov. 29, 1972, 32207/72
Int. Cl.² C07C *51/42*
U.S. Cl. 260—541 2 Claims

1. Process for recovering ammonium acetate from an aqueous solution containing the same in a concentration in the range from 0.2% to the salt solubility limit consisting in atomizing the aqueous solution in hot air at a temperature in the range from 100° to 150°C.

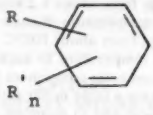
3,974,217

PREPARATION OF SUBSTITUTED PHENYL PHOSPHONOUS DICHLORIDES

James A. Miles, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed July 31, 1974, Ser. No. 493,301
Int. Cl.² C07F *9/46*
U.S. Cl. 260—543 P 11 Claims

1. A process for the preparation of substituted phenyl phosphonous dichlorides comprising the reaction of a substituted phenyl compound of the formula



wherein R is lower alkoxy or lower alkylthio and each R′ is independently lower alkyl, lower alkoxy or lower alkylthio and *n* is an integer from 0 to 2, inclusive, provided that, when *n* is 1, the position on the benzene ring para to R is occupied by hydrogen further provided that, when *n* is 2, no more than 2 lower alkoxy or lower alkylthio groups are positioned on adjacent carbon atoms of the benzene ring and at least two adjacent carbon atoms of the benzene ring have hydrogen substituents and phosphorous trichloride in the presence of stannic chloride.

3,974,218

PRE-EMERGENT CHEMICAL METHOD OF COMBATING UNWANTED VEGETATION

Roger P. Cahoy, Overland Park, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 88,166, Nov. 9, 1970, Pat. No. 3,707,366, which is a continuation-in-part of Ser. No. 9,419, Feb. 6, 1970, abandoned. This application July 7, 1972, Ser. No. 269,857
Int. Cl.² C07C *103/34*, *103/76*
U.S. Cl. 260—558 P 6 Claims

1. N-Benzyl-N-isopropylpivalamide.

3,974,219

PHOSPHONIUM SALT AND ITS USE

Noboru Yamazaki, and Fukuji Higashi, both of Tokyo, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 305,256, Nov. 10, 1972, abandoned. This application June 3, 1974, Ser. No. 475,877
Claims priority, application Japan, Nov. 12, 1971, 46-90767; Nov. 12, 1971, 46-90768; Nov. 22, 1971, 46-93872; Feb. 19, 1972, 47-17355
Int. Cl.² C07C *103/04*
U.S. Cl. 260—562 R 12 Claims

1. A process for producing an amide derivative which comprises contacting at a temperature of 0° to 200°C. a carboxylic acid of the formula,

R^1COOH

wherein R^1 is alkyl having 1 – 30 carbon atoms, halogen substituted alkyl having 1 – 10 carbon atoms, cycloalkyl having 3 – 8 carbon atoms, phenyl, C_{1-4} alkyl-substituted phenyl or phenylalkyl having 7–12 carbon atoms, with a phosphonium salt obtained by reacting a phosphorous ester selected from the group consisting of monomethyl, monoethyl, monoisopropyl, monophenyl, dimethyl, diethyl, diisopropyl, di-n-butyl, diphenyl, triethyl, triisopropyl and tributyl esters of phosphorous acid, and an ammonium salt of the phosphorous monoester, with an organic base selected from the group consisting of pyridine, 2-methylpyridine, 3-methylpyridine, 4-methylpyridine, 2,6-dimethylpyridine and triethylamine, and an oxidizing agent selected from the group consisting of bromine, iodine, mercurous chloride, mercuric chloride, mercuric bromide and mercuric acetate, the amount of said phosphonium salt being at least equimolar amount based on the amount of said carboxylic acid, at a temperature of from 30° to 200°C., and then reacting the resulting activated carboxylic acid with an amine derivative of the formula,

wherein R^2 and R^3 are independently alkyl having 1 – 10 carbon atoms, cycloalkyl having 3 – 8 carbon atoms, phenyl, C_{1-4} alkyl-substituted phenyl, C_{1-4} alkoxy-substituted phenyl or phenylalkyl having 7 – 12 carbon atoms, and one of R^2 and R^3 may be hydrogen, at a temperature of from 0° to 200°C.

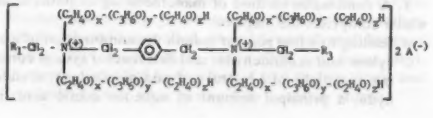
3,974,220

QUATERNARY AMMONIUM CORROSION INHIBITOR AND PETROLEUM DEMULSIFIER

Lorenz Heib, Hofheim, Taunus, and Martin Hille, Bad Soden, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 6, 1973, Ser. No. 386,229
Claims priority, application Germany, Aug. 8, 1972, 2238995; Aug. 8, 1972, 2238994
Int. Cl.² C07C *92/02*
U.S. Cl. 260—569.6 P 4 Claims

1. A compound of the formula



in which x is 1 or 2, y is zero to 8, z is 2 to 10, the sum of x plus z being equal to or greater than y, R_1 and R_2 each are alkyl or alkenyl of 5 to 24 carbons and $A^{(-)}$ is halogen.

3,974,221

PROCESS FOR PREPARING CYCLOHEXANONE FROM CYCLOHEXANOL

Raymond J. Duggan, West Seneca, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 28, 1970, Ser. No. 84,902
Int. Cl.[2] C07C *27/12, 45/02, 45/16*
U.S. Cl. 260—586 P 5 Claims

1. Process for the selective conversion of cyclohexanol to cyclohexanone which comprises heating cyclohexanol containing from 0.5 to 1.5 percent by weight of cobalt carbonate at a temperature from 145°–210°C. under pressure of 60–225 psig, introducing a molecular oxygen-containing gas and continuing the reaction so that over 90 percent by weight of the reacted cyclohexanol has been converted to cyclohexanone and recovering the cyclohexanone.

3,974,222

p-METH-8-ENE-6-THIOL-2-ONE

Dietmar Lamparsky, Wangen-Dubendorf, and Peter Schudel, Grut near Wetzikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 464,416, April 26, 1974, which is a division of Ser. No. 69,457, Sept. 8, 1970, Pat. No. 3,819,712.
This application Apr. 17, 1975, Ser. No. 569,120
Claims priority, application Switzerland, Sept. 10, 1969, 13748/69
Int. Cl.[2] C07C *49/48*
U.S. Cl. 260—586 R 1 Claim

1. p-Meth-8-ene-6-thiol-2-one.

3,974,223

PROCESS FOR MANUFACTURE OF 3,5-DITERT.BUTYL-4-HYDROXYBENZALDEHYDE FROM 3,5-DITERT.BUTYL-4-HYDROXYBENZYL ALCOHOL

Roger P. Cahoy, Overland Park, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed May 7, 1975, Ser. No. 575,554
Int. Cl.[2] C07C *45/16*
U.S. Cl. 260—600 R 4 Claims

1. The method of manufacturing 3,5-ditert.butyl-4-hydroxybenzaldehyde comprising reacting 3,5-ditert.butyl-4-hydroxybenzyl alcohol with at least one molar equivalent of hexamethylenetetramine or a mixture of at least 6 moles of formaldehyde and at least 4 moles of ammonia in aqueous acetic acid reaction medium of at least 50 volume percent concentration at a temperature within the range of 65° to 115°C sufficient to assure solution of the reactants and recovering said 3,5-ditert.butyl-4-hydroxybenzaldehyde from the resulting reaction mixture.

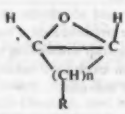
3,974,224

PROCESS FOR PREPARING ALDEHYDES FROM OXIRANE COMPOUNDS

Helmut Waldmann, Leverkusen; Wulf Schwerdtel, Leverkusen-Steinbuechel, and Wolfgang Swodenk, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 25, 1973, Ser. No. 409,544
Claims priority, application Germany, Oct. 27, 1972, 2252719
Int. Cl.[2] C07C *47/02, 47/52, 47/56, 121/58*
U.S. Cl. 260—601 R 8 Claims

1. Process for producing dialdehydes which comprises reacting an oxirane compound having the formula:



(II)

wherein n is an integer from 3 to 5 and each of the carbon atoms defined by n can be substituted by R independently of one another, where R is selected from the group of fluorine, chlorine, cyanide, C_1–C_6-alkoxy, C_1–C_6-alkyl, C_5–C_7-cycloalkyl, and phenyl optionally substituted by fluorine, chlorine, cyanide or C_1–C_6-alkoxy, with non-aqueous hydrogen peroxide in a solvent that does not react with the oxirane compound nor cause decomposition of the hydrogen peroxide, at a temperature of from −80° to 120°C in the presence of a boron compound selected from the group of a boron oxide, a boric acid, boric acid anhydride and a boric acid ester having the formula

wherein R_3, R_4 and R_5 independently of one another are selected from the group of C_1–C_6-alkyl, C_5–C_7-cycloalkyl and phenyl, said boron compound being present in a quantity of up to 20 mol percent based on the hydrogen peroxide.

3,974,225

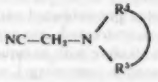
PROCESS FOR THE PREPARATION OF UNSATURATED ALDEHYDES

George H. Buchi, and Hans Wuest, both of Cambridge, Mass., assignors to Firmenich S.A., Geneva, Switzerland

Filed June 5, 1974, Ser. No. 476,430
Int. Cl.[2] C07C *45/21*
U.S. Cl. 260—601 R 1 Claim

1. A process for the preparation of α-sinensal which comprises:

a. brominating 3-methyl-penta-2,4-dienol,
b. reacting the obtained 3-methyl-penta-2,4-dien-1-yl bromide with mesityloxide at a temperature of from about −70°C to about −30°C in the presence of an alkali metal hydride or alkali metal amine,
c. reacting the obtained 3-isopropenyl-6-methyl-octa-5,7-dien-2-one with vinyl-magnesium bromide,
d. brominating the thus obtained 3,7-dimethyl-4-isopropenyl-3-nona-1,6,8-trien-3-ol at a temperature from about −5°C to about +20°C and in the presence of an inert organic solvent
e. treating the 3,7-dimethyl-4-isopropenyl-nona-2,6,8-trien-1-yl bromide obtained with an amino-cyanide of formula



IV

wherein each one of the symbols R^4 and R^5, identical or different, represents a lower alkyl radical, or R^4 together with R^5 and the nitrogen atom may constitute a heterocycloaliphatic ring as indicated by the dotted line, and subsequently adding to the reaction mixture a strong basic agent selected from the group consisting of potassium tert-butoxide, sodium ethoxide, potassium methoxide and potassium ethoxide,

f. converting the amino-nitrile obtained into 2,6-dimethyl-2-vinyl-3-isopropenyl-octa-5,7-dienal by treating it with a basic or a neutral reagent selected from the group consisting of alkali metal alkoxides or hydroxides and cyanide complexation agents, and in the presence of an inert organic solvent, and

g. thermally treating said aldehyde at a temperature above about 100°C in the presence of a basic or a neutral agent selected from the group consisting of an alkali metal salt, a strong base anion exchange resin and a tertiary amine in an inert organic solvent.

3,974,226
PROCESS FOR PREPARATION OF TERPENE FLAVORANTS AND NOVEL INTERMEDIATES THEREFOR

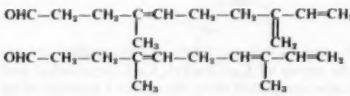
Erhard Bertele, Dubendorf, and Peter Schudel, Grut near Wetzikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 436,756, Jan. 25, 1974, which is a division of Ser. No. 742,178, July 3, 1968, Pat. No. 3,872,172. This application Oct. 16, 1974, Ser. No. 515,267

Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R **3 Claims**

1. A compound having the formula selected from the group consisting of



and

3,974,227
ACID EXTRACTED-ALKALIZED/CARBON CATALYST SUPPORT WITH COORDINATION COMPLEX CATALYST AND METHOD OF MANUFACTURE

Jean Berthoux, Decines, and Jacques-Pierre Martinaud, Lyon, both of France, assignors to Rhone-Progil, Paris, France

Continuation of Ser. No. 308,458, Nov. 21, 1972, abandoned. This application Mar. 20, 1975. Ser. No. 560,144

Claims priority, application France, Dec. 17, 1971, 71.46501

Int. Cl.² C07C *45/10*; B01J *31/18*, *31/24*, *21/18*

U.S. Cl. 260—604 HF **9 Claims**

1. A process for the preparation of a supported catalyst of a coordination complex of a transition metal useful in liquid phase reactions of olefin hydrogenation, hydroformylation and oxidation, of pre-activated carbon comprising:

contacting said pre-activated carbon with an amount of aqueous solution of a volatile acid sufficient to substantially eliminate by reaction therewith the acid-extractable impurities in said carbon, said aqueous solution of volatile acid comprising 0.5 to 20% by weight of said acid and being present in a large excess — compared with the quantity theoretically needed to eliminate the acid-extractable impurities — during its contact with said pre-activated carbon;

drying said acid treated pre-activated carbon;

treating said dried, acid treated, pre-activated carbon to render the carbon alkaline with an aqueous solution of a mineral basic substance containing 1×10^{-1} to 1×10^{-3} moles of said mineral basic substance from the group consisting of alkali and alkaline-earth hydroxides and alkali carbonates per liter of solution, said aqueous solution of mineral basic substance being present in a large excess — such that the ratio of its final concentration to its starting concentration is approximately one — during the contact with said dried, acid treated, pre-activated carbon;

drying the so base-treated carbon; and

depositing said coordination complex on the so-treated carbon in liquid phase, wherein said coordination complex has the formula $[M\ Cl_x\ H_y\ (CO)_z\ L_t]$

wherein

M is the metal nickel, rhodium, palladium, iridium or platinum;

$x + y = 1$ when M is rhodium or iridium;

x and $y = 0$ for the other metals;

the total of $x + y + z + t = 4$; and

L is a ligand selected from the group consisting of aliphatic and aromatic phosphites, aminophosphines, and — where $y = 1$ and $z = 0$ — aliphatic and aromatic phosphines.

6. A supported catalyst comprising a product obtained by the process of claim 1.

7. A process in accordance with claim 1 for preparing a supported catalyst wherein said depositing of said coordination complex on said carbon comprises:

mixing, in reactor, an olefin, hydrogen, carbon monoxide, a solvent comprising an aliphatic ketone, said coordination complex of a transition metal, and said carbon; and

carrying out a hydroformylation reaction and simultaneously fixing the active catalyst on the activated carbon support.

3,974,228
PREPARATION OF HYDROPEROXIDES BY AUTOXIDATION

Bruno J. Barone, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 29,679, April 17, 1970, abandoned. This application Mar. 10, 1975, Ser. No. 556,885

Int. Cl.² C07C *179/02*

U.S. Cl. 260—610 B **10 Claims**

1. In the process of preparing organic hydroperoxides comprising contacting a hydrocarbon of a tertiary alkane, cycloalkane or alkyl aromatic compound, said hydrocarbon having 3 to 30 carbon atoms, with molecular oxygen at a temperature in the range of about 110°– 170°C and a pressure sufficient to maintain the reactants in liquid phase, wherein the improvement is in conducting said process in the presence of at least 0.05 weight percent of a buffer comprising a carbonate, oxide or hydroxide of a metal selected from the group consisting of La, Gd, Pr, Nb, and Th,.

3,974,229
PREPARATION OF ORTHO-ALKYLATED PHENOLS

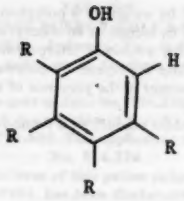
Bernardus J. Van Sorge, Selkirk, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 846,973, Aug. 1, 1969, abandoned, which is a continuation-in-part of Ser. No. 717,919, April 1, 1968, abandoned. This application Feb. 11, 1971, Ser. No. 114,698

Int. Cl.² C07C *37/16*

U.S. Cl. 260—621 R **15 Claims**

1. In a process for alkylating a phenol in the ortho position which comprises the vapor phase reaction in the presence of an alkylation catalyst of an alkyl alcohol and a phenol compound having the general formula:



where R is a monovalent substituent from the group consisting of hydrogen, alkyl, phenyl and alkyl substituted phenyl; the improvement comprising conducting the reaction in the presence of a catalyst comprising magnesium oxide bonded with from 1–15% by weight of manganese oxides.

3,974,230

STABILIZED 1,1,1-TRICHLOROETHANE

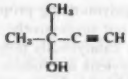
Wesley L. Archer, and David R. Spencer, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 9, 1974, Ser. No. 530,588

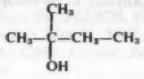
Int. Cl.² C07C *17/40*

U.S. Cl. 260—652.5 R **3 Claims**

1. A composition of matter consisting essentially of 1,1,1-trichloroethane and an effective amount of stabilizers sufficient to stabilize said composition from reacting with metals, said effective amount of stabilizers being: (1) from 3.5 to 6 volume percent of component (a) a mixture of 3-methyl-1-butyn-3-ol having the formula



and t. amyl alcohol having the formula



wherein said 3-methyl-1-butyn-3-ol is present in at least 1.75 volume percent of said mixture or component (b) 3.5 volume percent 3-methyl-1-butyn-3-ol; (2) 0.5to 2 volume percent of a nitroalkane selected from nitromethane or a mixture of nitromethane and nitroethane, said nitromethane or mixture of nitroalkanes being present in at least 1.0 volume percent when said component (1a) is 3.5 volume percent and at least 0.75 volume percent when said component is (1b); and, (3) 0.5 to 1 volume percent of an alkylene oxide having 4 to 6 carbon atoms including cyclohexene oxide as the essential acid acceptor.

3,974,231

PROCESS FOR THE PRODUCTION OF PURE CYCLOPENTENE

Friedrich-Wilhelm Küepper, and Roland Streck, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Apr. 30, 1974, Ser. No. 465,515

Claims priority, application Germany, May 23, 1973, 2326196

Int. Cl.² C07C *3/62, 13/12*

U.S. Cl. 260—666 A **11 Claims**

1. A process for the production of cyclopentene free of C_5-diene impurities, which comprises metathetically reacting a reaction mixture consisting essentially of cis,ciscyclodecadiene-(1,6) with a catalytic amount of a metathesis catalyst capable of promoting the ring-opening polymerization of cyclic olefins having at least one unsubstituted ring double bond which metathesis catalyst is a Ziegler-Natta catalyst consisting essentially of (a) a solvent soluble component of tungsten or molybdenum and (b) a solvent soluble alkylaluminum halide of the formula AlR_mX_n wherein R is lower alkyl of 1–6 carbon atoms, X is halogen, m is a whole or fractional number from 1 to 2 inclusive and the sum of $m + n$ equals 3, at a metathesis reaction temperature of from 0° C. up to the temperature at which said catalyst decomposes for a period of time sufficient to form a reaction product consisting essentially of cyclopentene having a C_5-diene content of less than 0.1 weight percent of the total reaction mixture.

3,974,232

METHOD FOR PRODUCING CYCLOHEXENE BY DEHYDRATION OF CYCLOHEXANOL

Hideyuki Aizawa, Konan; Akio Kuroda, Nagoya; Masahiro Minaga, Chita; Kozi Ohnishi, and Seikichi Matsuhisa, both of Nagoya, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed June 24, 1975, Ser. No. 590,017

Claims priority, application Japan, June 29, 1974, 49-74747

Int. Cl.² C07C *5/00*

U.S. Cl. 260—666 A **13 Claims**

1. A method for producing cyclohexene which comprises heating cyclohexanol in the presence of at least one heteropolyacid selected from the group consisting of tungstophosphoric acid, tungstosilicic acid, molybdophosphoric acid and molibdosilicic acid, and separating cyclohexene from the reaction mixture.

3,974,233

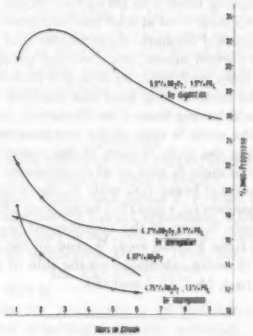
PROCESS FOR THE PRODUCTION OF A RHENIUM HEPTOXIDE/ALUMINA DISPROPORTIONATION CATALYST

Malcolm John Lawrenson, Leatherhead, England, assignor to BP Chemicals International Limited, London, England

Continuation-in-part of Ser. No. 381,343, July 20, 1973, abandoned. This application Oct. 17, 1974, Ser. No. 515,646

Int. Cl.² C07C *3/62*

U.S. Cl. 260—683 D **8 Claims**



1. A process for the disproportionation of an olefinic hydrocarbon feedstock which process comprises contacting an olefinic hydrocarbon or a mixture thereof selected from C_3 to C_{20} acyclic and branched chain olefins at a temperature in the range −20° to +500°C and a pressure in the range 0 to 2000 psig with a rhenium heptoxide supported on alumina disproportionation catalyst prepared by digesting the alumina support with an aqueous solution of an ammonium salt selected from ammonium phosphate, ammonium dihydrogen phosphate and diammonium hydrogen phosphate at a temperature

between ambient and the boiling point of the aqueous ammonium salt solution, the amount of phosphate ions in the alumina support being at a maximum of 16% by weight separating the treated alumina thereform and loading the treated alumina with between 1 and 15% by weight of rhenium heptoxide.

3,974,234

THERMOPLASTIC MOLDING COMPOSITIONS

Ludwig Brinkmann, Frankfurt am Main, and Harald Cherdron, Naurod, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 27, 1975, Ser. No. 544,345

Claims priority, application Germany, Jan. 28, 1974, 2403889

Int. Cl.² C08L 77/10

U.S. Cl. 260—857 G 9 Claims

1. A thermoplastic molding composition consisting essentially of (I) styrene polymer and (II) amorphous polyamide comprising:

I. from 0.1 to 50 weight % of an elastomer having grafted thereon at least one polystyrene or copolymer of styrene with a derivative of acrylic acid, said elastomer being selected from rubber-like polymers and copolymers of dienes, ethylene/ propylene/tercomponent rubbers, polyacrylic esters of alcohols having 4 to 8 carbon atoms and mixtures of said rubbers, and

II. from 99.9 to 50 weight % of at least one amorphous polyamide derived from

a_1. 5 to 50 mole % of cyclic diamine selected from 1,3-bis-(aminomethyl)-cyclohexane; 1,4-bis-(aminomethyl)-cyclohexane; 2,5-bis-(aminomethyl)-bicyclo[2,2,1]heptane; 2,6-bis-(aminomethyl)-bicyclo[2,2,1]heptane; bis-(4-aminocyclohexyl)-derivative of an alkane having from 1 to 6 carbon atoms; m-xylylene diamine with up to 50 mole % of the m-xylylene diamine being replaced by p-xylylene diamine, and mixtures of such diamines,

a_2. 0 to 45 mole % of at least one straight-chain or branched aliphatic diamine having from 4 to 20 carbon atoms, the amino groups being separated by at least 4 carbon atoms,

b_1. 5 to 50 mole % of at least one aromatic dicarboxylic acid having from 7 to 20 carbon atoms,

b_2. 0 to 45 mole % of at least one saturated, straight-chain or branched aliphatic dicarboxylic acid having from 6 to 20 carbon atoms, the carboxyl groups being separated from each other by at least 4 carbon atoms, and

c. 0 to 80 mole % of at least one aliphatic amino carboxylic acid having from 2 to 20 carbon atoms or its lactam, the mole % sum of the components (a_1) and (a_2) equaling the mole % sum of the components (b_1) and (b_2), the mole % sum of all components (a_1), (a_2) (b_1), (b_2) and (c) being 100 mole %, the mole % sum of the components (a_1) and (b_1) being from 20 to 95 mole %, the mole % sum of the components (a_2), (b_2) and (c) being from 5 to 80 mole %, and all the values given in mole % being calculated on the sum of all components (a_1), (a_2), (b_1), (b_2) and (c).

3,974,235

BLENDS OF A POLYPHENYLENE ETHER RESIN, ALKENYL AROMATIC RESINS MODIFIED WITH EPDM RUBBER AND FLAME RETARDANT

Glenn D. Cooper, and Visvaldis Abolins, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 401,986, Oct. 1, 1973. This application Dec. 19, 1974, Ser. No. 534,272

Int. Cl.² C08L 51/06

U.S. Cl. 260—876 R 9 Claims

1. A thermoplastic molding composition which comprises:

a. from 20–65% by weight of a polyphenylene ether resin;

b. from 35–80% by weight of an alkenyl aromatic resin that is modified with a rubbery interpolymer of a mixture of monoolefins and a polyene by polymerizing an alkenyl aromatic monomer in the presence of said rubbery interpolymer; and

c. a flame retardant amount of a flame-retardant additive.

3,974,236

PROCESS FOR PRODUCING MODIFIED POLYPROPYLENE

Michio Koga, and Hideo Sato, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan

Filed Feb. 18, 1975, Ser. No. 550,594

Claims priority, application Japan, Feb. 27, 1974, 49-22330

Int. Cl.² C08F 297/08

U.S. Cl. 260—878 B 9 Claims

1. A process for producing a heteroblock copolymer of propylene and ethylene which comprises:

First Stage: at least one step of catalytically polymerizing propylene to produce isotactic polypropylene and at least one step of catalytically polymerizing a mixture of ethylene and propylene to produce an ethylene/propylene copolymer, the ethylene content in the mixture being 0.2 to 3% by weight, the content of the isotactic polypropylene being up to 25% by weight of the heteroblock copolymer to be produced in the First Stage, the First Stage being initiated by polymerizing propylene and the both steps being carried out successively;

Second Stage: further catalytically polymerizing a mixture of ethylene and propylene to produce another copolymer of ethylene and propylene, the content of ethylene in the mixture being at least 50% by weight, until the quantity of the copolymer has amounted to 5 to 20% by weight of the heteroblock copolymer to be finally produced.

3,974,237

BLOCK COPOLYMER PROCESSES

Kenneth H. Brumbaugh, and James J. McAlpin, both of Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Feb. 21, 1975, Ser. No. 551,895

Int. Cl.² C08F 297/08

U.S. Cl. 260—878 B 10 Claims

1. A process for the copolymerization of alpha-olefins which comprises the steps of (a) feeding a solid polymeric alpha-olefin which contains an active catalyst into two parallel fluid-bed reactors, a first reactor and a second reactor; (b) concurrently injecting into said first reactor a first olefinic gaseous monomer stream and injecting into said second reactor a second different olefinic gaseous monomer stream for a predetermined period of time; (c) terminating said streams to said first and second reactors; (d) injecting said first and second streams into respectively the second and first reactors for a predetermined period of time; (e) continuously repeating steps (b), (c) and (d) on a cyclic basis in order to produce a block olefinic copolymer therein; and (f) concurrently withdrawing said block olefinic copolymer from said reactors during said cyclic injections.

3,974,238

SOLID RUBBER GOLF BALL

George C. Schweiker, Ardmore, Pa., and John W. Jepson, Marion, Mass., assignors to Acushnet Company, New Bedford, Mass.

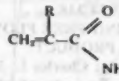
Continuation-in-part of Ser. No. 406,335, Oct. 15, 1973, abandoned, which is a division of Ser. No. 203,856, Dec. 1, 1971, Pat. No. 3,791,655. This application Oct. 11, 1974, Ser. No. 514,274

The portion of the term of this patent subsequent to Feb. 12, 1991, has been disclaimed.

Int. Cl.² C08L 9/00

U.S. Cl. 260—879 11 Claims

1. In a golf ball, a composition comprising a cured composition of polybutadiene having a cis 1,4 polybutadiene content of at least 40%, from 1% to 40% by weight of polybutadiene of α,β ethylenically unsaturated carboxamide groups having in their monomer form the following structural formula:



wherein:

R is hydrogen, or a methyl, ethyl, fluoro, chloro, or bromo group; and

Z is hydrogen, or an alkyl, aryl or heteroatom substituted alkyl or aryl group;

at least some of said carboxamide groups being graft polymerized to said polybutadiene the grafted carboxamide groups being attached to the polybutadiene at only one site, and hydrogen ions serving to bond at least some of the grafted carboxamide groups to each other.

3,974,239

MANUFACTURE OF IMPACT-RESISTANT OLEFINIC-NITRILE COPOLYMERS

Russell K. Griffith, Chagrin Falls, and John F. Jones, Cuyahoga Falls, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 222,979, Feb. 2, 1972, abandoned. This application Sept. 2, 1975, Ser. No. 609,373

Int. Cl.² C08F 291/04, 291/06, 291/12

U.S. Cl. 260—879 9 Claims

1. The process comprising polymerizing in an aqueous medium to at least 70% by weight conversion of a monomer component consisting of

A. from 70 to 90% by weight of at least one nitrile having the structure

wherein R is a member selected from the group consisting of hydrogen, a lower alkyl group having from 1 to 4 carbon atoms and a halogen, and

B. from 10 to 30% by weight based on the combined weights of (A) and (B) of at least one ester having the structure

wherein R_1 is a member selected from the group consisting of hydrogen, an alkyl group having from 1 to 4 carbon atoms and a halogen, and R_2 is an alkyl group having from 1 to 6 carbon atoms,

and then including in the polymerization from 1 to 40 parts by weight per 100 parts by weight of (A) + (B) of (C) a monomer component having at least one conjugated diene monomer selected from the group consisting of butadiene and isoprene, and continuing the polymerization to a final conversion of from 80 to 100% by weight of monomers to polymer.

3,974,240

THERMOPLASTIC ELASTOMER COMPOSITIONS

Jan Bock, Piscataway; Robert D. Lundberg, Somerville; Robert R. Phillips, Spring Lake Heights, and Henry S. Makowski, Scotch Plains, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Nov. 18, 1974, Ser. No. 524,502

Int. Cl.² C08L 23/16, 23/12, 23/06

U.S. Cl. 260—897 B 12 Claims

1. A composition of matter which comprises a blend of an intractable ionic elastomer, said elastomer consists essentially of sulfonated nonaromatic hydrocarbon polymers, said elastomer comprising a continuous phase of said blend and said elastomer being characterized as having a shear stress as measured at a shear rate of 0.74 sec^{-1} of at least 1×10^6 dynes/cm^2 at 200°C, and from 10 to 90 parts per hundred elastomer of a crystalline polyolefin having a degree of crystallinity of at least 25%.

3,974,241

BLENDS OF SULFONATED ELASTOMERS WITH CRYSTALLINE POLYOLEFINS

Robert D. Lundberg, Somerville; Robert R. Phillips, Spring Lake Heights, both of N.J.; Lowell Westerman, Baytown, Tex., and Jan Bock, Piscataway, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Nov. 18, 1974, Ser. No. 524,512

Int. Cl.² C08L 23/16, 23/12, 23/06

U.S. Cl. 260—897 B 10 Claims

1. A composition of matter which comprises a blend of a sulfonated elastomer and a crystalline polyolefin wherein said sulfonated elastomer consists essentially of sulfonated nonaromatic hydrocarbon polymers and said sulfonated elastomer comprises a continuous phase of said blend, and a crystalline polyolefin, said sulfonated elastomer comprising from about 0.2 to about 20 mole percent sulfonate groups, at least 95% of which are combined with metal counter ions selected from the group consisting of Groups I and II of the Periodic Table of the Elements, aluminum, and lead; organic amines; and mixtures thereof, said sulfonated elastomer being further characterized as having a shear stress as measured at a shear rate of 0.74 sec^{-1}, of less than 1×10^6 dynes/cm^2 at 200°C, and said crystalline polyolefin is characterized as having a degree of crystallinity of at least 25%, said blend further characterized as having a weight ratio of crystalline polyolefin to the sulfonated elastomer of from less than 1.0 to 0.05.

3,974,242

PROCESS FOR PRODUCING PHOSPHAZENE FIRE RETARDANT AND PRODUCT

Carroll W. Lanier, Baker, and James T. F. Kao, Baton Rouge, both of La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 369,171, June 12, 1973, abandoned. This application Dec. 5, 1974, Ser. No. 529,760

Int. Cl.² C07C 9/15

U.S. Cl. 260—927 N 15 Claims

1. A process for producing a phosphonitrilate polymer suitable for fire retarding cellulosic materials, said process comprising reacting, in the presence of an amount of an acid acceptor sufficient to complex with at least twice the molar amount of hydrogen halide formed, a phosphonitrilic halide with a hydroxyl compound selected from aliphatic alcohols having from 1 to about 6 carbon atoms and aromatic alcohols having from 6 to about 10 carbon atoms according to the steps of:

a. contacting a mixture of said phosphonitrilic halide and said acid acceptor with from at least about 85 to about 180 weight percent of the theoretical amount based on said phosphonitrilic halide of said hydroxyl compound at a tem-

perature of not more than about 40°C, whereby a relatively low concentration of said hydroxyl compound is present during the initial ⅓ to about 3 hours of the reaction and whereby condensation occurs between intermediate phosphonitrilate alkoxy or aryloxy ester species and phosphonitrilic halides or partially esterified phosphonitrilates with the evolution of an alkyl or aryl halide compound, and

b. thereafter, maintaining the reaction mixture at a temperature of from about 20° to about 50°C for a period of from about ½ to about 120 hours.

2. A phosphonitrilate polymer prepared according to the process of claim 1.

3,974,243

CARBOXYPHENYL-ALKYLPHOSPHINIC ESTERS

Hans-Jerg Kleiner, Bad Soden, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

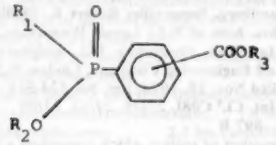
Filed Sept. 13, 1974, Ser. No. 505,630

Claims priority, application Germany, Sept. 17, 1973, 2346657

Int. Cl.² C07F 9/32

U.S. Cl. 260—941 **7 Claims**

1. A carboxyphenyl-alkylphosphinic acid ester of the formula



wherein R_1 is alkyl having 1 to 4 carbon atoms, R_2 is alkyl having 1 to 12 carbon atoms or oxyalkyl having the formula $HO-(CH_2)_n-CHR-$, and R_3 is hydrogen, alkyl having from 1 to 12 carbon atoms, or oxyalkyl having the formula $HO-(CH_2)_n-CHR-$, wherein n is 1 to 3 and R is hydrogen or alkyl having 1 to 4 carbon atoms.

3,974,244

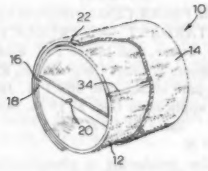
HUMIDIFIER PAD

James P. Donachiue, Apartment 801,70 Park St., Port Credit, Ontario, Canada

Continuation of Ser. No. 419,122, Nov. 26, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,533

Int. Cl.² B01F 3/04

U.S. Cl. 261—92 **6 Claims**



1. In a humidifier having a housing, a water reservoir in said housing, means for directing a flow of air to be humidified through said humidifier, and a hollow cylindrical shaped humidifier pad mounted in said housing for rotation therein, a lower portion of said humidifier pad being immersed in water contained in said water reservoir, said humidifier pad comprising a network of criss-crossing flexible plastic ribs which define a plurality of unobstructed openings extending from an inner surface to an outer surface of said humidifier pad which permits communication between said inner and outer surfaces, and a plurality of substantially even length projections extending outwardly from at least one of said inner or outer surfaces, said projections being integrally molded to said criss-crossing ribs, all surfaces of said humidifier pad being external of the pad, said unobstructed openings being of sufficient cross-sectional area to permit a flow of air therethrough from one of said surfaces to the other of said surfaces where a water film spans an unobstructed opening to present water to said flow of air to be humidified, said network of criss-crossing plastic ribs being formed of a plastic which is sufficiently rigid so that said hollow cyclindrical shaped humidifier pad is self-supporting and which is sufficiently flexible to permit flexing of said humidifier pad and cause distortion of said ribs to release scale from the external surfaces of said pad, the flexible humidifier pad attempting to recover its original cylindrical shape after flexing of the pad.

3,974,245

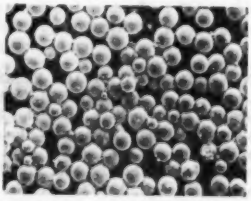
PROCESS FOR PRODUCING FREE FLOWING POWDER AND PRODUCT

Richard F. Cheney, Towanda; Charles L. Moscatello, Sayre, and Frederick J. Mower, Towanda, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 425,226, Dec. 17, 1973, Pat. No. 3,909,241. This application Apr. 25, 1975, Ser. No. 571,642

Int. Cl.² B22D 23/08

U.S. Cl. 264—10 **5 Claims**



1. Process for producing a free flowing flame spray powder consisting essentially of substantially spherical particles of an inorganic material having a melting point above 500°C; the particles having an apparent density of at least 40 percent of the theoretical density of the material, a particle size distribution within the range of about 60 micrometers, substantially smooth non-porous surfaces and a Hall flow within the range of from about 9 to 21 seconds; the process comprising:

a. entraining powder particles in a carrier gas, said particles consisting essentially of agglomerates of a finely divided particulate of the inorganic material, the agglomerates having a size range of 60 micrometers and 80 percent of the agglomerates having a size range of 30 micrometers,

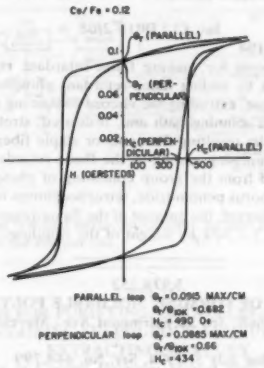
b. feeding the entrained particles through a high temperature reactor having a temperature above the melting point of the highest melting component of the powder material, at a feed rate sufficient to result in the melting of at least the outer surfaces of a substantial portion of the particles, and

c. cooling the at least partially melted particle to solidify at least the outer surfaces of the particles prior to their contact with a solid surface or with each other.

3,974,246
METHOD OF IMPROVING THE MAGNETIC PROPERTIES OF COBALT SUBSTITUTED MAGNETITE

Shih-Lu Chen, and James A. Murphy, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 257,335, May 26, 1972, Pat. No. 3,859,129. This application Feb. 11, 1974, Ser. No. 441,130
Int. Cl.[2] B06B *1/02*
U.S. Cl. 264—24 11 Claims



1. A method of improving magnetic properties of a magnetic material comprising the steps of

providing a quantity of magnetic material comprising at least one phase thereof cobalt substituted magnetite material having a cobalt to iron ratio of between about 0.0345 and about 0.665,

subjecting said material to a magnetic field having sufficient field strength and an orientation to magnetize said material in a desired direction,

removing said material from said magnetic field, said material retaining a remanent level of magnetization in said desired direction, and thereafter

annealing said magnetized material at a temperature between about 95°C and about 200°C in an atmosphere non-reactive with said material for a period of time sufficient to increase the hysteresis loop squareness ratio of said material.

3,974,247
PROCESS FOR SHAPING COMPONENTS MADE OF CONCRETE OR MORTAR

André Tardieu, La Couronne, France, assignor to Societe Anonyme Coignet, Paris, France

Filed July 23, 1973, Ser. No. 381,570
Claims priority, application France, July 26, 1972, 72-27197; Aug. 17, 1972, 72-29762
The portion of the term of this patent subsequent to May 28, 1991, has been disclaimed.
Int. Cl.[2] B28B *1/00*
U.S. Cl. 264—28 6 Claims

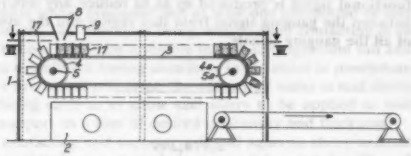
1. A method of fabricating mortar or concrete elements of predetermined shape, comprising

at least partly filling molding means of complementary predetermined shape with a water containing mortar or concrete forming mixture,

freezing the mixture, prior to setting, in the mold until the mixture attains an intermediate solid phase,

removing the frozen mixture of predetermined shape from the molding means, and

placing said frozen mixture of predetermined shape in an

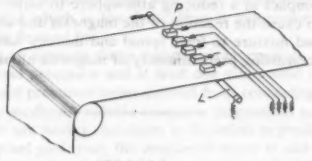


ambient atmosphere, and letting it harden through combined phases of thawing and setting.

3,974,248
PROFILE DETERMINING AND/OR CONTROLLING SYSTEM

Edward Browell Atkinson, Ipswich, England, assignor to Bakelite Xylonite Limited, London, England

Filed Sept. 5, 1973, Ser. No. 394,416
Claims priority, application United Kingdom, Sept. 8, 1972, 41858/72
Int. Cl.[2] B29D *7/00*
U.S. Cl. 264—40.2 7 Claims



1. A method for controlling the profile of a characteristic of an article, which comprises the steps of measuring said characteristic by means of a plurality of individual sensing means, simultaneously producing an individual electrical gauging signal for each sensing means determining the average of all said individual signals, the magnitude of each individual signal being a substantially linear function at least over a working range of the characteristic at a particular region of the article, the slopes of all the substantially linear functions having the same sign, detecting any difference in magnitude occurring between each individual signal and said average of all said signals, electrically deriving directly from said difference a functional signal for any such difference which is correlated with the region of the article from which it is derived and utilizing each functional signal to control a device for adjusting said characteristic of at least one article subsequently produced in the same run of an article producing apparatus in any region for which a functional signal is produced so as to reduce any difference between the gauging signal from that region and the average of all the gauging signals.

7. Apparatus for controlling the profile of a characteristic of an article, said apparatus comprising a plurality of individual sensing means for measuring said characteristic, means for simultaneously producing an individual gauging signal for each sensing means, and means for determining the average of all said individual signals, the magnitude of each individual signal being a substantially linear function, at least over a working range, of said characteristic at a particular region of the article with the slopes of all the substantially linear functions having the same sign, means for detecting any difference in magnitude between each individual signal and said average of all said signals, means for electrically deriving directly from said difference a functional signal for any such difference which is correlated with the region of the article from which it is derived, and means for utilizing each functional signal to

control a device for adjusting the characteristic of the article or articles subsequently produced in the same run of an article producing apparatus in any region of the article for which a functional signal is produced so as to reduce any difference between the gauging signal from that region and the average of all the gauging signals.

3,974,249

METHOD FOR MANUFACTURING A TRANSPARENT CERAMIC BODY

Donald W. Roy, and Franklin J. Stermole, both of Golden, Colo., assignors to Coors Porcelain Company, Golden, Colo.

Continuation-in-part of Ser. No. 72,846, Sept. 16, 1970, abandoned. This application Oct. 10, 1972, Ser. No. 296,420

Int. Cl.² F27B *9/04, 9/10*

U.S. Cl. 264—65 **11 Claims**

1. A method for manufacturing a ceramic body comprising the steps of forming a uniform mixture containing approximately equal molar amounts of magnesia and alumina and from about 0.2% to 5% by weight lithium fluoride, the alumina in said mixture having a particle size of less than about 0.5 microns, calcining said mixture at a temperature of at least about 800°C for a time that there is less than about 80% reaction of the alumina and magnesia to form spinel, forming the calcined mixture into a self-sustaining compact and firing the compact in a reducing atmosphere to sintering temperature to cause the reaction of the magnesia and alumina in the calcined mixture to form spinel and thereby form a sintered body consisting predominately of magnesia-alumina spinel.

3,974,250

METHOD FOR REDUCING CRYSTALLINE ORIENTATION OF PARA-OXYBENZOYL POLYESTERS

Steve G. Cottis, Amherst; James Economy, Eggertsville; Roger S. Storm, Williamsville, and Luis C. Wohrer, Lewiston, all of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed Sept. 4, 1973, Ser. No. 394,023

Int. Cl.² B29B *3/00*

U.S. Cl. 264—68 **13 Claims**

1. A method for improving the moldability of a para-oxybenzoyl polymer having a decomposition temperature in excess of 510°C, which polymer is infusible at temperatures below the decomposition temperature of the para-oxybenzoyl polymer; which polymer has a molecular weight in excess of 10,000, and a crystal-crystal transition temperature in excess of 300°C, but below the decomposition temperature of the polyester, comprising

1. subjecting a para-oxybenzoyl polymer having a decomposition temperature in excess of 510°C, which polymer is infusible at temperatures below the decomposition temperature of the para-oxybenzoyl polymer; which polymer has a molecular weight in excess of 10,000, and a crystal-crystal transition temperature in excess of 300°C, but below the decomposition temperature of the polyester, while the polymer is in a solid state, to a heat treatment at a temperature between the crystal-crystal transition temperature and the decomposition temperature of the polymer to reduce the crystallinity of the polymer, the polymer being heated being of a degree of polymerization sufficient to withstand melting at the heat treatment temperature;
2. cooling the polymer quickly, within a period of from 0.1 to 100 seconds, to below the crystal-crystal transition temperature of the polymer; and
3. molding or otherwise forming the polymer when in such state of reduced crystallinity.

3,974,251

PRODUCTION OF FLAMEPROOF FIBERS OF REGENERATED CELLULOSE

Joseph Cremer, Hermulheim; Heinz Harnisch, Lovenich, both of Germany; Johannes Adolf Krässig; Johannes Hüpfl, both of Seewalchen, Austria, and Werner Gschaider, Vocklabruck, Austria, assignors to Hoechst Aktiengesellschaft, Cologne, Germany and Chemiefaser Lenzing Aktiengesellschaft, Lenzing, Austria

Filed Mar. 4, 1974, Ser. No. 447,756

Claims priority, application Germany, Mar. 7, 1973, 2311180

Int. Cl.² D01F *2/08*

U.S. Cl. 264—194 **5 Claims**

1. In a process for making flame-retardant regenerated cellulose fibers by adding flame-retardant phosphorus compounds to viscose, extruding the viscose containing mixture so obtained into a spinning bath and, if desired, stretching and after-treating the resulting filaments or staple fibers, the improvement comprising adding as the flame-retardant a compound selected from the group consisting of phosphorus nitride, triphosphorus pentanitride, tetraphosphorus hexanitride and mixtures thereof, the amount of the flame-retardant being approximately 5 – 30% by weight of the cellulose.

3,974,252

PROCESS OF FORMING MOLDABLE POLYMERS

Robert F. Bischoff, Jr., 30 Fairmount Ave., Morristown, N.J. 07960

Filed July 5, 1974, Ser. No. 444,799

Int. Cl.² B29C *5/00*

U.S. Cl. 264—299 **2 Claims**

1. A method of forming an arch, curve, or other geometric figure in filled or unfilled polymer, without clamping the peripheral portion of said moldable polymer, by:

a. heating the moldable filled or unfilled polymer until it is in a moldable liquefied state;
b. providing an open mold and allowing the liquefied polymer to conform to the shape of the mold;
c. cooling spaced apart portions of the said heated polymer so that said cooled portions contract and set;
d. retaining the uncooled portions in a heated molten or semi-molten state;
e. having the cooled portions exert pressure during contraction and setting upon the uncooled molten or semi-molten portions which are intermediate the spaced apart cooled portions;
f. having said exertion of pressure of said cooled portions upon said intermediate uncooled portions cause the said intermediate uncooled molten or semi-molten portions to form an arch, curve, or other geometric figure with relation to the said already cooled portions.

3,974,253

LEACHING OF COPPER ORES TO RECOVER SULFUR AND SILVER CATALYST

George J. Snell, Fords, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Jan. 15, 1975, Ser. No. 541,274

Int. Cl.² C01G *5/00*

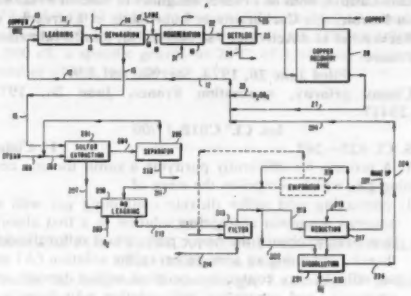
U.S. Cl. 423—27 **11 Claims**

1. In a process for the oxidative leaching of a copper ore with a leaching solution in the presence of a catalytic amount of silver initially dissolved in the leaching solution to solubilize copper values from the ore, wherein leaching solution containing dissolved copper values is separated from solid tailings, said solid tailings including silver employed as catalyst and elemental sulfur, the improvement comprising:

extracting elemental sulfur from the solid tailings to produce extracted solid tailings containing no more than 2% by weight, elemental sulfur;

leaching silver from said extracted solid tailings by contacting the tailings with molecular oxygen and concentrated

sulfuric acid having a concentration of at least 50 weight percent to produce a sulfuric acid solution containing dissolved silver; and



recycling leached silver, as catalyst, to said oxidative leaching of the copper ore.

3,974,254

PROCESS FOR PURIFYING METALLURGICAL GASES CONTAINING SULPHUROUS ANHYDRIDE BY EXTRACTING MERCURY

Antonio de la Cuadra Herrera; Miguel Fernandez Taliante, and Armando Rodriguez Sanchez, all of Madrid, Spain, assignors to Patronato de Investigacion Cientifica y Tecnica "Juan de la Cierva" del Consejo Superior de Investigaciones Cientificas, Madrid, Spain

Filed Dec. 10, 1973, Ser. No. 423,001

Claims priority, application Spain, Jan. 29, 1973, 411067

Int. Cl.[2] B01D *47/00*

U.S. Cl. 423—210 **14 Claims**

1. A process for purifying metallurgical gases by extracting mercury from such gases containing sulphurous anhydride comprising contacting the gases with a thiocyanate dissolved in an aqueous sulphuric acid solution, oxidizing the mercury by means of the sulphurous anhydride being present in an amount sufficient to act as an oxidizing agent for the mercury to be extracted, the sulfuric acid solution having an acidity sufficient to facilitate the oxidation of the mercury and the thiocyanate completing the oxidation of the mercury to be extracted.

3,974,255

METHOD FOR TREATMENT OF ENGINE EXHAUST GASES

Henry Erickson, Park Forest, and John Mooi, Hazelcrest, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation of Ser. No. 340,348, March 12, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,107

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—212 **15 Claims**

1. In a process for reducing the amounts of hydrocarbon and carbon monoxide emitted to the atmosphere from the exhaust gases of an internal combustion engine which comprises contacting said exhaust gases with an oxidation catalyst at conditions to oxidize at least a portion of the hydrocarbon and carbon monoxide contained in said exhaust gases, the improvement comprising employing a long-lasting, durable, efficient catalyst comprising a first magnesium aluminate spinel support and, disposed as a coating on said first magnesium aluminate spinel, a mixture comprising second magnesium aluminate spinel and at least one metal component present in an amount sufficient to promote the oxidation of at least a portion of the hydrocarbon and carbon monoxide contained in said exhaust gases, said metal component comprising a metal which is less basic than is magnesium, said catalyst being formed by:

1. forming an aqueous slurry comprising magnesium aluminate spinel precursor and at least one compound of said metal, said precursor being derived from contacting in an aqueous medium a soluble inorganic magnesium salt and a soluble salt having aluminum in the anion to precipitate a first spinel precursor, the amount of water in said slurry being such as to allow said slurry to be applied to said support as a film of desired uniformity and thickness;
2. contacting said support with said aqueous slurry to form a coated support including a metal-containing film of desired uniformity and thickness on said support; and
3. treating said coated support at a temperature and for a time sufficient to calcine said magnesium aluminate spinel precursor and form said catalyst.

9. A process for reducing the amount of nitrogen oxide emitted to the atmosphere from the exhaust gases of an internal combustion engine which comprises contacting said exhaust gases with a catalyst at conditions to chemically reduce at least a portion of nitrogen oxides contained in said exhaust gases, the improvement comprising employing a longlasting, durable, efficient catalyst comprising a first magnesium aluminate spinel support and, disposed as a coating on said first magnesium aluminate spinel support, a mixture comprising second magnesium aluminate spinel and at least one metal component present in an amount sufficient to promote the chemical reduction of at least a portion of the nitrogen oxides contained in said exhaust gases, said metal component comprising a metal which is less basic than is magnesium, said catalyst being formed by:

1. forming an aqueous slurry comprising magnesium aluminate spinel precursor and at least one compound of said metal, said precursor being derived from contacting in an aqueous medium a soluble inorganic magnesium salt and a soluble salt having aluminum in the anion to precipitate a first spinel precursor, the amount of water in said slurry being such as to allow said slurry to be applied to said support as a film of desired uniformity and thickness:
2. contacting said support with said aqueous slurry to form a coated support including a metalcontaining film of desired uniformity and thickness on said support; and
3. treating said coated support at a temperature and for a time sufficient to calcine said magnesium aluminate spinel precursor and form said catalyst.

3,974,256

SULFIDE REMOVAL PROCESS

Kenneth S. Wheelock, and Clyde L. Aldridge, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

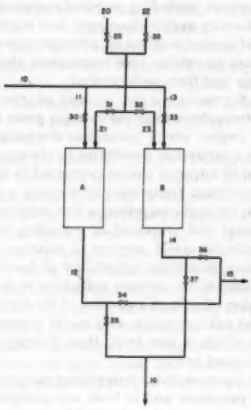
Filed May 7, 1974, Ser. No. 467,716

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—230 **35 Claims**

1. A process for reducing the sulfide concentration of a reducing gas feed mixture wherein the sulfide is hydrogen sulfide, carbonyl sulfide, or a mixture thereof, which comprises contacting the feed at a temperature above about 300°F. with a sorbent comprised of a metal-containing compo-

nent, said metal being selected from the group consisting of lanthanum, rare earths, mixtures of rare earths, and mixtures



of lanthanum with at least one rare earth, the sulfide concentration being reduced by sorption of the sulfide by the sorbent.

3,974,257

PROCESS FOR REMOVING SULFUR DIOXIDE CONTAINED IN A GAS

Claude Dezael, Maisons Lafeitte; André Deschamps, Chatou, and Henri Gruhier, Chatillon-sous-Bagneaux, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

Filed Oct. 22, 1974, Ser. No. 516,918

Claims priority, application France, Oct. 22, 1973, 73.37655

Int. Cl.² C01B *17/00*

U.S. Cl. 423—242 **6 Claims**

1. A process for removing sulfur dioxide contained in a gas as an impurity comprising (1) contacting said gas with an aqueous ammonia solution to absorb sulfur dioxide in the form of ammonium sulfites, (2) reacting the resulting solution with hydrochloric acid to obtain a SO_2 containing gas and an aqueous ammonium chloride solution, and separating the SO_2 containing gas from the aqueous ammonium chloride solution and (3) reacting the ammonium chloride solution with magnesium oxide, so as to produce an ammonia-containing gas, and an aqueous magnesium chloride solution; heating said aqueous magnesium chloride solution to a sufficiently high temperature to produce magnesium oxide and hydrochloric acid, and employing said ammonia-containing gas, and the hydrochloric acid and magnesium oxide from step (3) in steps (1), (2) and (3), respectively.

3,974,258

PROCESS FOR PURIFYING A SULFUR DIOXIDE CONTAINING GAS

Jean-Pierre Poitevin, Marly-le-Roi, and Claude Dezael, Maisons-Laffitte, both of France, assignors to Institut Francaise du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

Filed June 20, 1974, Ser. No. 481,238

Claims priority, application France, June 26, 1973, 73.23417

Int. Cl.² C01B *17/00*

U.S. Cl. 423—242 **11 Claims**

1. A process for efficiently purifying a sulfur dioxide containing gas, which comprises the steps of

1. contacting said sulfur dioxide containing gas with an aqueous ammonia absorption solution in a first absorption zone to absorb the major part of said sulfur dioxide, thereby obtaining an ammonium sulfite solution (A) and an effluent gas containing residual sulfur dioxide and ammonia, and separating said solution (A) from said effluent gas,
2. contacting said separated effluent gas with a dilute aqueous ammonium sulfite solution (B) in a second absorption zone to absorb residual sulfur dioxide and ammonia thereby producing an ammonium sulfite solution (C) and a gas practically free of sulfur dioxide and ammonia, and
3. electrodialyzing the solution (C) in at least one multistage electrodialysis cell comprising a plurality of alternatively cation-permselective and anion-permselective membranes, thereby producing a relatively concentrated ammonium sulfite solution (D) and a dilute ammonium sulfite solution (E), separately recovering each of the solutions (D) and (E), and recycling solution (E) to step (2) to constitute at least a portion of the absorption solution (B).

3,974,259

MONOVALENT METAL SALTS OF DODECAMETAL TRIACONTA CARBONYLS

Earle S. Brown, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 27, 1974, Ser. No. 455,380

Int. Cl.² C01G *57/00*

U.S. Cl. 423—249 **22 Claims**

1. Mixed metal triaconta carbonyl salts of the formula:

$$M_2[T_xT'_{12-x}(CO)_{30}]$$

wherein M is a monovalent metal cation selected from the group consisting of sodium, potassium, lithium, rubidium, cesium, francium, rhodium, copper, silver, gold, iridium, indium, and thallium, T and T' are each different metals selected from the group consisting of cobalt, iridium and rhodium, and *y* may be any whole number between 1 and 11.

3,974,260

DESENSITIZED FREE-FLOWING RED PHOSPHORUS

Joachim Wortmann, Hurth; Franz-Josef Dany, Erftstadt Lechenich; Hedwig Preil, Knapsack, and Joachim Kandler, Erftstadt Lechenich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 4, 1973, Ser. No. 403,462

Claims priority, application Germany, Oct. 11, 1972, 2249638

Int. Cl.² C01B *25/023*

U.S. Cl. 423—265 **3 Claims**

1. Desensitized non-dusting free-flowing red phosphorus comprising a homogeneous blend consisting of between about 80 and 98 weight % of red phosphorus having a particle size of up to about 2 mm, and of between about 2 and 20 weight % of a desensitizer compound selected from the group consisting of a chlorinated paraffin oil containing between about 30

and 70 weight % of chlorine and having a viscosity of between about 100 and 15,000 centipoises at 18°C., tris-(β-chloroethyl)-phosphate, tricresylphosphate, a silicon-polyether block copolymer having a viscosity at 25°C. of 1,000 – 1,500 centistoke, a density at 25°C. of 1.04 and a refractive index at 25°C. of 1.445 – 1,448 and a copolymer of dimethylpolysiloxane and polyoxyalkylene ether having a viscosity at 25°C of 1,200 to 1,500 cS, a specific gravity at 20°C. of 1.04 and a hydroxyl number of 4–6 mg KOH/g.

3,974,261

PROCESS FOR PURIFICATION OF PHOSPHONITRILIC CHLORIDE POLYMERS

Charles R. Bergeron, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 6, 1974, Ser. No. 521,273

Int. Cl.² C01B *25/10*

U.S. Cl. 423—300 **10 Claims**

1. A process for purifying crude phosphonitrilic chloride polymers to obtain trimeric and tetrameric cyclic phosphonitrilic chloride polymers comprising passing a solvent vapor which is a saturated aliphatic hydrocarbon having from about 6 to about 8 carbon atoms through molten phosphonitrilic chloride polymer at a rate of from about 0.003 to about 0.25 gram-mole per minute per gram-mole of phosphonitrilic chloride polymer to obtain said solvent vapor containing said trimeric and tetrameric phosphonitrilic chloride polymers, said molten phosphonitrilic chloride polymer being at a temperature up to about 190°, condensing the resultant vapor stream containing said solvent and said trimeric and tetrameric cyclic phosphonitrilic chloride polymers, and separating said trimeric and tetrameric cyclic phosphonitrilic chloride polymers from the condensed solent.

3,974,262

TWO STAGE PROCESS FOR PRODUCING AMMONIUM PHOSPHATES

John David Crerar, and John David Crowther Hemsley, both of Felixstowe, England, assignors to Fisons Limited, London, England

Filed Jan. 10, 1975, Ser. No. 539,990

Claims priority, application United Kingdom, Jan. 16, 1974, 2138/74; Apr. 4, 1974, 14912/74

Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—313 **8 Claims**

1. A process for producing solid ammonium phosphates which process comprises reacting in the liquid phase and at a pressure of from −0.1 to +1.5 kg/cm² in a first stage phosphoric acid containing from 35 to 60% by weight of P_2O_5 and up to 20% by weight of H_2SO_4 with gaseous ammonia, the major part of said ammonium gas having been obtained from a source outside the process, so as to produce a fluid ammonium phosphate having an NH_3:H_3PO_4 molar ratio which varies from 0.1:1 to 1.45:1 and a water content of from 10 to 45% by weight, passing this reaction product from the first stage to a second stage where it is reacted with gaseous ammonia at a pressure of from 0.5 to 3.5 kg/cm² to form a fluid ammonium phosphate having an NH_3:H_3PO_4 molar ratio of from 0.95:1 to 1.85:1 and containing from 4 to 20% by weight of water; and discharging this fluid ammonium phosphate into a zone of lower pressure to form a solid ammonium phosphate containing from 2 to 11% by weight of water.

3,974,263

PROCESS FOR PRODUCING AMMONIUM PHOSPHATE IN TWO STAGES

John David Crerar; John David Crowther Hemsley, and Ian Clive Hepworth, all of Felixstowe, England, assignors to Fisons Limited, London, England

Filed Jan. 10, 1975, Ser. No. 539,992

Claims priority, application United Kingdom, Apr. 4, 1974, 14912/74

Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—313 **8 Claims**

1. A process for producing solid ammonium phosphates in two stages which process comprises reacting in the liquid phase in a first stage phosphoric acid containing from 35 to 60% by weight of P_2O_5 and up to 20% by weight of H_2SO_4 at a pressure of from −0.1 to +1.5 kg/cm² gauge with ammonia gas obtained from the ammonia-containing off-gases of the second stage of the process so as to produce a fluid ammonium phosphate product having an NH_3:H_3PO_4 molar ratio which varies from 0.1:1 to 1.45:1 and containing from 10 to 45% by weight of water; passing the said reaction product from the first stage to a second stage operating at higher pressure wherein the reaction product is reacted at a pressure of from 0.5 to 3.5 kg/cm² gauge with ammonia gas to form a fluid ammonium phosphate having an NH_3:H_3PO_4 molar ratio of from 0.95:1 to 1.85:1 and a water content of from 4 to 20% by weight; discharging this fluid ammonium phosphate into a zone at lower pressure so as to produce a solid ammonium phosphate containing from 2 to 11% by weight of water: and recovering ammonia values from the off-gases of the said second stage of the process for use as the major source of ammonia gas in the first state of the process.

3,974,264

PROCESS FOR PRODUCING CARBON FIBERS FROM MESOPHASE PITCH

Edgar Ronald McHenry, Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 423,693, Dec. 11, 1973. This application Oct. 31, 1974, Ser. No. 519,636

Int. Cl.² C01B *31/07*

U.S. Cl. 423—447.4 **2 Claims**

1. In a process for producing a high-modulus, high-strength carbon fiber which comprises spinning a carbonaceous fiber from a nonthixotropic carbonaceous mesophase pitch which under quiescent conditions forms a homogeneous bulk mesophase having large coalesced domains, thermosetting the fiber so produced by heating the fiber in an oxygen-containing atmosphere for a time sufficient to render it infusible, and carbonizing the thermoset fiber by heating it in an inert atmosphere, the improvement which comprises spinning the carbonaceous fiber from a mesophase pitch which has been prepared while passing an inert gas through the pitch during formation of the mesophase at a rate of at least 0.5 scfh. per pound of pitch while heating the pitch in an inert atmosphere at a temperature of from 350°C. to 450°C. for a time sufficient to produce a mesophase content of from 40 per cent by weight to 90 per cent by weight.

3,974,265

CHLORINE PENTAFLUORIDE COMPLEXES

Richard E. Eibeck, Convent Station; William B. Fox, Wharton, and Bernard Sukornick, Morristown, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 27, 1965, Ser. No. 452,455

Int. Cl.² C01B *7/24*

U.S. Cl. 423—466 **8 Claims**

1. Compounds of the formula:

$$ClF_5.XF_5$$

wherein X is a member selected from the group consisting of As and Sb.

3,974,266

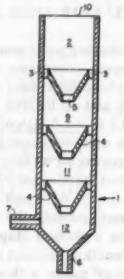
PRODUCTION OF CHLORINE DIOXIDE

Willard A. Fuller, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 556,379, March 7, 1975. This application Oct. 7, 1975, Ser. No. 620,452

Int. Cl.[2] C01B *11/02;* C01D *5/02, 3/04;* C01B *7/03*

U.S. Cl. 423—478 5 Claims



1. In a process for continuously generating a mixture containing chlorine dioxide, chlorine and sulfate wherein

a. an alkali metal chlorate, an alkali metal chloride and sulfuric acid are continuously reacted in a single vessel generator-evaporator-crystallizer in proportions to generate chlorine dioxide, chlorine and alkali metal sulfate, in the absence of a catalyst;

b. the temperature is maintained at from about 65° to about 85° centigrade;

c. the acidity of the reaction solution is maintained at from above 4 to about 11 normal;

d. the reaction solution is subjected to a vacuum of from about 100 to about 400 millimeters of mercury absolute to effect evaporation of water vapor;

e. chlorine dioxide and chlorine produced by said reaction is withdrawn in admixture with said water vapor; and

f. alkali metal acid sulfate is continuously crystallized within said single vessel generator-evaporator-crystallizer and continuously withdrawn therefrom;

the improvement which comprises

continuously passing the alkali metal acid sulfate crystals produced in said single vessel generator-evaporator-crystallizer in the form of a slurry into the top of a metathesis column, in a downward flow;

countercurrently passing a stream of dilute hydrochloric acid upwardly through said column at a rate and in amounts sufficient to effect reaction with said alkali metal acid sulfate, converting said alkali metal acid sulfate to sulfuric acid and alkali metal chloride, continuously returning the sulfuric acid and chlorate values substantially completely to said single vessel generator-evaporator-crystallizer; and

continuously removing alkali metal chloride slurry from the bottom of said metathesis column.

3,974,267

MANUFACTURE OF IRON OXIDES

Eugene M. Urban, Jr., Trenton, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Apr. 24, 1975, Ser. No. 571,115

Int. Cl.[2] C01G *49/02*

U.S. Cl. 423—633 7 Claims

1. A method of producing a highly acicular, crystalline iron oxide (hydrated ferric oxide) which comprises

a. adding, with agitation, an aqueous solution of ferrous sulfate to an aqueous solution containing at least a stoichiometric equivalent of a base selected from the hydroxides and carbonates of sodium and potassium, thus forming ferrous hydroxide, with the pH of the mixture being maintained at 12 or higher and the temperature of the mixture being maintained in the range of about 20°–35°C.,

b. aerating the aqueous mixture with an oxygen-containing gas, at a rate of about 0.00145 to about 0.00169 lbs. O_2/min./lb. of added $FeSO_4$, said aeration resulting in the formation of nuclei of $Fe_2O_3.xH_2O$,

c. aerating the mixture at the rate given in step (b), for a period of from about 10 to about 40 minutes, so that the nuclei grow to acicular-shaped seeds having a diameter of about 6–18mμ and a length of about 40–80mμ, and until approximately 15 to 40% of the ferrous hydroxide is converted to hydrated ferric oxide, and

d. reducing the aeration rate to a range of from about 0.00048 to about 0.00056 lbs. O_2/min./lb. of added ferrous sulfate, until the residual ferrous hydroxide is essentially completely converted to hydrated ferric oxide.

3,974,268

BONE-SEEKING TECHNETIUM-99M IMIDODIPHOSPHONATE COMPLEX

Gopal Subramanian, Manlius, and John Gilmore McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,176

Int. Cl.[2] A61K *43/00;* G01T *1/16;* C01B *21/10*

U.S. Cl. 424—1 11 Claims

1. A bone-seeking composition suitable for use as a skeletal imaging agent comprising a technetium-99m-tin-imidodiphosphonate complex.

3,974,269

RADIOIMMUNE ASSAY METHOD FOR DETECTION OF GONORRHEA ANTIBODIES

Frank Maley, Delmar, N.Y., assignor to Research Corporation, New York, N.Y.

Filed July 12, 1974, Ser. No. 487,971

Int. Cl.[2] G21H *5/02;* G01T *1/16;* A61K *43/00*

U.S. Cl. 424—1.5 11 Claims

1. A radioimmunoassay method for determining the presence of *Neisserria gonorrhoeae* antibodies in human serum which comprises the steps of:

A. adding anti-human IgG to the serum to be tested in a buffered aqueous medium,

B. thereafter adding a heat labile antigen which has been produced by a growth culture of *Neisseria gonorrhoeae*, isolated therefrom, and labelled with a detectable radioactive element,

C. incubating resulting mixture at from about 4°C to 45°C for from about 24 to 2 hours at a pH of from about 6.5 to 8.5 to form an antigen-antibody conjugate when said antibodies are present, and

D. determining the level of radioactivity as a measure of the presence of said antigen-antibody conjugate.

3,974,270

PRESSURIZED COMPOSITION FOR THE PRODUCTION OF A DRY SPRAY OF MILD BUT EFFECTIVE NON-STAINING ANTIPERSPIRANT

Divaker B. Kenkare, South Plainfield, and Marius R. Moran, Hillsborough, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 3, 1972, Ser. No. 303,574

Int. Cl.[2] A61K *7/38*

U.S. Cl. 424—47 5 Claims

1. A composition in a pressurized container for the production of a dry spray of mild but effective non-staining antiperspirant which consists essentially of from 2 to 7% of powdered aluminum chlorhydrate, said proportion being sufficient to have an effective antiperspirant action, from 2 to 9% of a polypropoxylated cetyl alcohol having from 3 to 100 propoxy

groups, and from 80 to 95% of a propellant fluid to maintain pressure in the container and to aid in discharging the antiperspirant composition therefrom.

3,974,271

LIPSTICK CONTAINING 8-AMINO-2-(AZO-BENZENE-4-SULPHONIC ACID)-1-NAPHTHOL-3,6-DISULPHONIC ACID OR AN EDIBLE SALT THEREOF

Arthur Ernest Billington, Watford, England, assignor to Beecham Group Limited, England

Division of Ser. No. 387,749, Aug. 13, 1973, Pat. No. 3,892,872. This application Feb. 3, 1975, Ser. No. 546,272

Claims priority, application United Kingdom, Aug. 19, 1972, 38761/72; Oct. 5, 1972, 45922/72

Int. Cl.² A61K *7/025*

U.S. Cl. 424—64 **4 Claims**

1. A lipstick comprising an amount of 8-amino-2-(azo-benzene-4-sulphonic acid)-1-naphthol-3,6-disulphonic acid or an edible salt thereof sufficient to impart the desired degree of red color to the lipstick in combination with a carrier suitable for formation of a lipstick.

3,974,272

PALATABLE CHOLESTYRAMINE COACERVATE COMPOSITIONS

Gerald P. Polli, Somerville, N.J., and Clyde E. Shoop, Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 285,719, Sept. 1, 1972, abandoned. This application Jan. 25, 1974, Ser. No. 436,420

Int. Cl.² A61K *31/785, 47/00*

U.S. Cl. 424—78 **20 Claims**

1. An oral palatable composition comprising an aqueous medium selected from the group consisting of water, milk and fruit juice; a modified gum selected from the group consisting of hydrophilic colloid of cellulosive material and charged anionic gum wherein the hydrophilic colloid of cellulosive material is selected from the group consisting of methyl cellulose, ethyl cellulose, sodium carboxymethyl cellulose, hydroxy ethyl cellulose and hydroxypropyl cellulose and the charged anionic gum is selected from the group consisting of carageenan, sodium alginate, potassium alginate and propylene glycol alginate; and an effective amount of cholestyramine, wherein there is present from about 4 to 10 parts of cholestyramine and from about 4 to 10 oz. of the aqueous medium per part of modified gum to the total weight of the formulation and wherein the cholestyramine and the modified gum, in the presence of the aqueous medium, are in coacervate form.

3,974,273

COMPOUND NA-337 AND A PROCESS FOR PRODUCING THE SAME BY FERMENTATION

Satoshi Omura, Tokyo; Haruo Tanaka, Machida; Juichi Awaya; Yaeko Konda, Tokyo; Yoshitsugu Narimatsu, Hiratsuka, and Masayuki Onda, Tokyo, all of Japan, assignors to The Kitasato Institute, Tokyo, Japan

Filed Mar. 14, 1975, Ser. No. 558,573

Claims priority, application Japan, Apr. 3, 1974, 49-36939

Int. Cl.² A61K *35/66;* **C12B** *1/00;* **C12K** *1/00*

U.S. Cl. 424—122 **7 Claims**

1. A new compound having the following characteristics as hydrochloride:

Elementary analysis:

Found: C - 64.31%
H - 8.71%
N - 7.10%

Calculated (as $C_{10}H_{11}N.HCl$): C - 64.68%
H - 8.68%
N - 7.54%

Molecular weight:
m/e of free NA-337 determined by mass spectrum — 149.122 Theoretical value for $C_{10}H_{11}N$ — 149.120

Melting point: 150°C (decomposed)

Ultraviolet absorption spectra
λ_{max}^{MeOH} nm(ε): 267 (19,000); 300 (12,500)

Infrared absorption spectra
Comparatively strong absorption at 2500–3000, 1650, 1625, 1605, 1383, 1353, 1328, 1300, 1223, 1182, 1166, 1010, 932 and 905 when measured by KBr method.

Solubility
Easily soluble in water, methanol and ethanol; soluble in chloroform and hardly soluble in benzene and n-hexane.

Color reactions:
Positive in the reactions with Dragendorff's reagent and platinum chloride-potassium iodide reagent; negative in the reactions with ninhydrin, anthrone and ferric chloride reagents.

2. A process for producing a new compound according to claim 1 by fermentation comprising the steps of culturing aerobically an NA-337 producing microorganism belonging to the verticillate group of the genus Streptomyces in a medium and recovering the accumulated NA-337 from the cultured medium.

3,974,274

PROCESS FOR PREPARING A CYCLODEXTRIN DERIVATIVE

Hironori Kurita; Mitsutaka Kawazu, both of Urawa, and Kohki Takashima, Tokyo, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

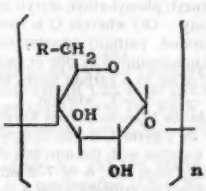
Filed May 22, 1974, Ser. No. 472,377

Claims priority, application Japan, Dec. 23, 1972, 47-1536; Dec. 23, 1972, 47-1537

Int. Cl.² C07H *3/00*

U.S. Cl. 424—180 **23 Claims**

1. A cyclodextrin derivative of the formula:



wherein R is methylamino or dimethylamino and *n* is an integer of 6 or 7, or a pharmaceutically acceptable acid addition salt thereof.

3,974,275

1,4-DIHYDROPYRIDINE CARBOXYLIC ACID ESTERS USEFUL AS CORONARY VESSEL DILATORS AND ANTI-HYPERTENSIVES

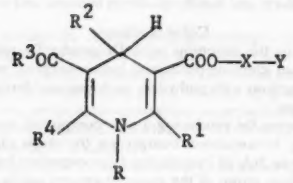
Friedrich Bossert; Horst Meyer, both of Wuppertal, and Wulf Vater, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 350,381, April 12, 1973, Pat. No. 3,905,970. This application Feb. 10, 1975, Ser. No. 548,395
Claims priority, application Germany, Apr. 18, 1972, 2218644

Int. Cl.² A61K *31/535*

U.S. Cl. 424—248 50 Claims

1. A pharmaceutical composition useful for effecting coronary vessel dilation in humans and animals and for treating hypertension in humans and animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is hydrogen, straight- or branched-chain lower alkyl, lower alkenyl or lower alkynyl;

R^1 and R^4 are the same or different and are each hydrogen or straight- or branched-chain lower alkyl;

X is straight- or branched-chain lower alkylene;

Y is α-, β- or γ-pyridyl, or the moiety NR′R″ wherein

R′ and R″, together with the nitrogen atom to which they are attached, form a 5-, 6- or 7- membered heterocyclic ring wherein said nitrogen atom is the only heteroatom, or a 5-, 6- or 7- membered heterocyclic ring which has one additional heteroatom selected from the group consisting of oxygen, sulphur, NH and N-(lower alkyl);

R^2 is phenyl unsubstituted or substituted by 1, 2, or 3 substituents selected from the group consisting of nitro, lower alkyl, lower alkoxy, phenyl, trifluoromethyl and halogen; benzyl; phenyl-ethyl; styryl; or naphthyl; and

R^3 is the moiety —OQ wherein Q is straight, branched or cyclic, saturated, partially unsaturated or unsaturated lower alkyl unsubstituted by one or two hydroxyl groups, alkoxyalkyl of up to 6 carbon atoms in both moieties or the moiety —O—X′—Y′ wherein

X′ is straight- or branched-chain lower alkylene and

Y′ is α-, β- or γ-pyridyl, or the moiety NR′R″ wherein

R′ and R″ together with the nitrogen atom to which they are attached form a 5-, 6- or 7-membered heterocyclic ring wherein said nitrogen atom is the only heteroatom or a 5-, 6- or 7-membered heterocyclic ring which has one additional heteroatom selected from the group consisting of oxygen, sulphur, NH and N-(lower alkyl) in combination with a pharmaceutically acceptable carrier.

3,974,276

CERTAIN DIAZINES AS PLANT PESTICIDES

Charles Brian Barlow, Camberley; Brian Graham White, Crowthorne, and Clive Dudley Spencer Tomlin, Maidenhead, all of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 230,513, Feb. 29, 1972, Pat. No. 3,906,098. This application Apr. 28, 1975, Ser. No. 572,830
Claims priority, application United Kingdom, Mar. 19, 1971, 7289/71; Mar. 19, 1971, 7290/71; Mar. 19, 1971, 7293/71

Int. Cl.² A01N *9/22*

U.S. Cl. 424—250 4 Claims

1. A method of combatting insect, fungal and bacterial plant pests which comprises applying to said plants a pesticidally effective amount of a compound of the formula X—NH—Y wherein X is selected from the group consisting of a pyrazinyl radical bearing one to three substituents and a pyridazinyl radical bearing two to three substituents; and Y represents phenyl, naphthyl, pyridyl or diazinyl bearing at least one substituent; the substituents in each case being selected from the group consisting of halogen, cyano, nitro, trifluoromethyl, lower alkoxy, lower alkylthio, benzylthio, lower alkyl and amino; said compound bearing at least four substituents of which at least two are halogen atoms.

3,974,277

2-[2-(5-NITRO-2-FURYL)VINYL]-4-(ANILINO)-QUINAZOLINES AS GROWTH PROMOTANTS AND FEED EFFICIENCY ENHANCING AGENTS

Herman Horn, Staten Island, N.Y.; Sheldon B. Greenbaum, Livingston; Charles M. Ely, Berkeley Heights, both of N.J.; Walter Hacke, New York, N.Y., and David A. Olle, North Arlington, N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 503,854, Sept. 6, 1974. This application Apr. 23, 1975, Ser. No. 570,645

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 23 Claims

1. An edible feed composition for promoting growth and improving feed efficiency in animals comprising a growth promoting amount and feed efficiency improving amount of 2-[2-(5-nitro-2-furyl)vinyl]-4-(p-hydroxyanilino)quinazoline present in an edible feed stuff to improve growth promotion and feed efficiency.

3,974,278

1,4-DIHYDROPYRIDINE ESTERS

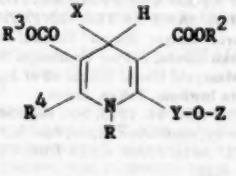
Friedrich Bossert, Wuppertal; Egbert Wehinger, Neviges; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 485,300, July 2, 1974, abandoned. This application May 12, 1975, Ser. No. 576,724
Claims priority, application Germany, July 12, 1973, 2335466

Int. Cl.² C07D *213/55;* A01N *9/22*

U.S. Cl. 424—251 12 Claims

1. A compound selected from the group consisting of a dihydropyridine of the formula:



and the pharmaceutically acceptable nontoxic salts thereof wherein

Y is alkylene of 1 to 4 carbon atoms;
Z is alkyl of 1 to 4 carbon atoms;
R is hydrogen, alkyl of 1 to 4 carbon atoms, or alkenyl of 2 to 4 carbon atoms; each of R^2 and R^3, independent of the other, is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl bf 2 to 6 carbon atoms or cycloalkyl of 3 to 10 carbon atoms;
R^4 is hydrogen, alkyl of 1 to 6 carbon atoms, Z-O-Y- wherein Z and Y are as defined above, or carbalkoxymethyl; and
X is unsubstituted or substituted by dialkylamino of 1 to 4 carbon atoms in each alkyl group, or pyridyl.

3,974,279

N,N'-BIS-(6-AMINO)-4,4-HEXAMETHYLENEDIAMINO QUINALDINE DIHYDROCHLORIDE AS AN ANTI-L-1210 LYMPHOID AND P388 LYMPHOCYTIC LEUKEMIA AGENT

Adolph Oscar Geiszler, Mundelein, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 370,498, June 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 316,934, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 281,257, Aug. 16, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,386

Int. Cl.[2] A61K *31/47*

U.S. Cl. 424—258 **3 Claims**

1. A method of prolonging the survival time of a mammalian L-1210 lymphoid and P388 lymphocytic leukemia cancer host comprising administering 30-600 mg/kg body weight of the compound N,N'-bis-(6-amino)-4,4-hexamethylenediamino quinaldine or a pharmaceutically acceptable acid addition salt thereof to said host.

3,974,280

BENZOTHIOPHENES

Raymond Bernasconi, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

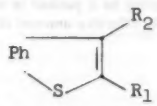
Filed Dec. 3, 1974, Ser. No. 529,174

Claims priority, application Switzerland, Dec. 6, 1973, 17107/73; Aug. 30, 1974, 11838/74

Int. Cl.[2] A61K *9/22*

U.S. Cl. 424—263 **21 Claims**

1. A benzo[b]thiophene of the formula



(I)

wherein Ph is o-phenylene unsubstituted or at most di-substituted by C_1-C_4-lower alkyl, C_1-C_4-lower alkoxy, chlorine or hydroxy, R_1 or R_2 is piperidyl which is saturated or contians a C-C-double bond emanating from the ring-C-atom bound to the benzo[b]thienyl radical, and, if saturated, at this C-atom is unsubstituted or substituted by hydroxy, and which at its other ring-C-atoms is unsubstituted or substituted by one methyl, and which at its N-atom is unsubstituted or substituted by C_1-C_4-lower alkyl, C_3-C_4-lower alkenyl, C_3-C_4-lower alkynyl, C_3-C_6-cycloalkyl-C_1-C_4-lower alkyl, benzyl, C_1-C_4-lower alkylbenzyl, C_1-C_4-lower alkoxybenzyl, halobenzyl, 2-phenethyl or α-methyl-2-phenethyl, and R_2 or R_1 is hydrogen or C_1-lower alkyl, and its pharmaceutically acceptable acid addition salts.

3,974,281

5-METHYL-1-PHENYL-2-(1H)-PYRIDONE COMPOSITIONS AND METHODS OF USE

Shreekrishna M. Gadekar, Trenton, N.J., assignor to Affiliated Medical Research, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 380,655, July 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 315,836, Dec. 18, 1972, Pat. No. 3,839,346. This application Dec. 9, 1974, Ser. No. 530,684

Int. Cl.[2] A61K *31/44*

U.S. Cl. 424—263 **8 Claims**

1. A pharmaceutical composition which comprises 100–500 mg. of 5-methyl-1-phenyl-2-(1H)-pyridone together with a pharmaceutically acceptable carrier in dosage unit form.

3,974,282

HYPOGLYCEMIC STILBAZOLTE DERIVATIVES

Kurt Engel, Basel, Switzerland, and David Edward Thorne, Cranleigh, England, assignors to Beecham Group Limited, Great Britain

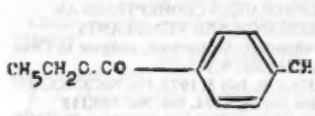
Continuation of Ser. No. 412,098, Nov. 2, 1973, abandoned. This application May 12, 1975, Ser. No. 576,376

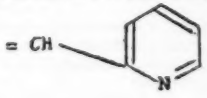
Claims priority, application United Kingdom, Nov. 4, 1972, 50924/72

Int. Cl.[2] A61K *31/44;* **C07D** *213/06*

U.S. Cl. 424—263 **3 Claims**

1. The compound 2-(4-ethoxycarbonylstyryl)-pyridine of formula:





3,974,283

N-SUBSTITUTED-4-t-BUTYL-1-PYRIDINETHIOCARBOXAMIDES AND THEIR USE FOR TREATMENT OF INFLAMMATION OR PAIN

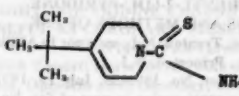
Robert E. Manning, Mountain Lakes, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 452,189, March 18, 1974, abandoned, which is a continuation of Ser. No. 321,234, Jan. 5, 1973, abandoned. This application June 19, 1975, Ser. No. 588,249

Int. Cl.[2] A01N *9/22;* **C07D** *213/83;* **260** *294.8 E*

U.S. Cl. 424—263 **11 Claims**

1. A compound of the formula



where R represents lower alkyl or lower alkenyl.

10. The method of treating inflammation which comprises orally or parenterally administering to a mammal in need of said treatment an anti-inflammatory effective amount of a compound of claim 1.

3,974,284

1,1a,6,10b-TETRAHYDRO-1,6-METHANO-DIBENZO[a,e]CYCLOPROPA[c]CYCLOHEPTENES AS ANTIDEPRESSANTS AND STIMULANTS

Herbert Schröter, Fullinsdorf, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

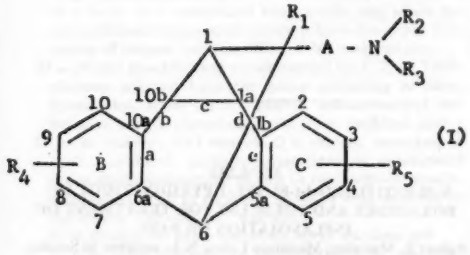
Division of Ser. No. 376,670, July 5, 1973, Pat. No. 3,883,537. This application Dec. 6, 1974, Ser. No. 530,115

Claims priority, application Switzerland, July 7, 1972, 10215/72

Int. Cl.[2] A61K *9/22*

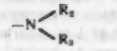
U.S. Cl. 424—267 5 Claims

1. An antidepressive and stimulating pharmaceutical composition comprising an antidepressively and stimulating effective amount of a compound having the formula I



(I)

wherein R_1 represents hydrogen or the hydroxy group, R_2 and R_3 represent hydrogen or alkyl groups having 1 to 3 carbon atoms, R_4 and R_5 represent hydrogen, and A represents the direct bond, an alkylene radical having 1 to 3 carbon atoms, or together with



the 1-methyl-4-piperidyl radical, or one of its pharmaceutically acceptable addition salts with an inorganic or organic acid, together with a diluent and/or carrier.

3,974,285

10,11-FURO-DERIVATIVES OF CYPROHEPTADINE

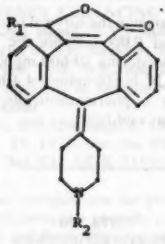
David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 459,493, April 10, 1974, Pat. No. 3,894,032. This application Jan. 30, 1975, Ser. No. 545,646

Int. Cl.[2] C07D *405/10*

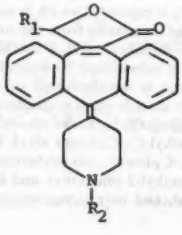
U.S. Cl. 424—267 12 Claims

1. A compound of the formula:



wherein R_1 is hydrogen or lower alkyl having from one to five carbon atoms and R_2 is lower alkyl having from one to five carbon atoms, and the nontoxic pharmaceutically acceptable acid addition salts thereof.

9. A method of treatment of a hypercholinergic condition comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound having the structure:



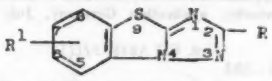
or a nontoxic pharmaceutically acceptable acid addition salt thereof, wherein R_2 is lower alkyl having from one to five carbon atoms and R_1 is hydrogen or lower alkyl having from one to five carbon atoms.

3,974,286
S-TRIAZOLO[5,1-b]BENZOTHIAZOLES AS FUNGICIDAL AGENTS

Charles J. Paget, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 7, 1975, Ser. No. 547,828
Int. Cl.² A01N 9/12, 9/22
U.S. Cl. 424—270 **9 Claims**

1. A method of reducing the adverse effects of foliage-attacking fungi which comprises contacting the fungi with an effective fungus-inhibiting amount of a compound of the formula



wherein

R represents hydrogen, hydroxy, or methyl;

R^1 represents hydrogen, methyl, ethyl, chloro, propyl, fluoro, isopropyl, bromo, or methoxy;

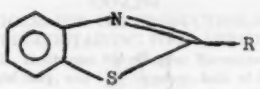
provided that methoxy, propyl and isopropyl R^1 groups occupy only the 5-position.

3,974,287
CONTROL OF ACARIDS USING CERTAIN BENZOTHIAZOLES OR BENZOTHIAZOLINES

Winchester L. Hubbard, Woodbridge; Robert E. Grahame, Jr., Cheshire; Rupert A. Covey, Bethany, and Elmar H. Jancis, Naugatuck, all of Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 543,717, Jan. 24, 1975, Pat. No. 3,928,617, which is a division of Ser. No. 420,749, Nov. 30, 1973, Pat. No. 3,876,791. This application Aug. 20, 1975, Ser. No. 606,376
Int. Cl.² A01N 9/22
U.S. Cl. 424—270 **6 Claims**

1. A method of controlling acarids comprising applying, to a locus subject to attach by acarids, an acaricidal amount of a benzothiazole of the formula



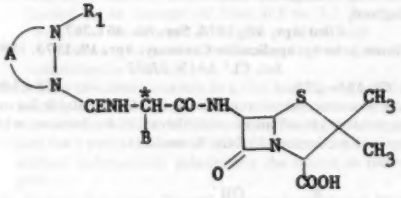
where R is 1-naphthyl or 2-naphthyl.

3,974,288
PENICILLINS

Wilfried Schröck; Karl-Georg Metzger, and Hans-Bodo König, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 461,227, April 15, 1974. This application Jan. 28, 1975, Ser. No. 544,812
Claims priority, application Germany, Apr. 19, 1974, 2320039
Int. Cl.² A61K 31/43
U.S. Cl. 424—271 **127 Claims**

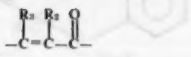
1. A pharmaceutical composition for treating bacterial infections in humans and animals which comprises an antibacterially effective amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R_1 is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

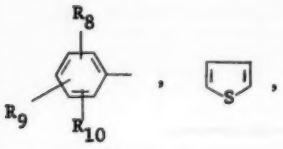
A is

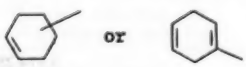


wherein

R_3 and R_5 are the same or different and each is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

R is:





wherein

R_8, R_9 and R_{10} are the same or different and each is hydrogen, fluoro, chloro, bromo, iodo, lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, sulphamyl, nitro, cyano, di(lower alkyl) amino, lower alkanoylamino, lower alkanoyloxy, lower alkylsulphonylamino, trifluoromethyl or hydroxy;

E is oxygen or sulphur; and

C is a carbon atom constituting a center of chirality in combination with a pharmaceutical carrier.

3,974,289

COUMARIN DERIVATIVES FOR THE TREATMENT OF ALLERGIES

Derek Richard Buckle, Redhill; Harry Smith, Maplehurst, near Horsham, and Barrie Christian Charles Cantello, Horsham, all of England, assignors to Beecham Group Limited, England

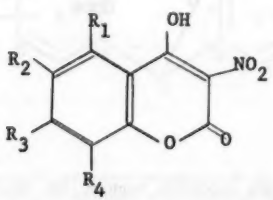
Filed Apr. 15, 1974, Ser. No. 461,267

Claims priority, application Germany, Apr. 19, 1973, 18876

Int. Cl.² A61K *31/37*

U.S. Cl. 424—281 **58 Claims**

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to humans which comprises a compound of the formula (I)



(I)

or a pharmaceutically acceptable non-toxic salt thereof, wherein R_1, R_2, R_3 and R_4 are each hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenoxy, benzyloxy, phenyl, benzyl, pyridyl, hydroxy, nitro, or halogen or any two of the groups R_1, R_2, R_3 and R_4 taken together with the carbon atoms to which they are joined form a phenyl or 1,2-cyclohexenylene ring, in an amount sufficient to be effective for the prophylaxis of asthma, hayfever, or rhinitis in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier suitable for said administration form.

3,974,290

VASODILATING AND ANTIHYPERTENSIVE COMPOSITIONS AND METHODS OF EFFECTING VASODILATION AND TREATING HYPERTENSION UTILIZING 2-AMINO-4H PYRANE AS THE ACTIVE AGENT

Horst Meyer; Friedrich Bossert, both of Wuppertal; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 375,809, July 2, 1973, Pat. No. 3,897,462.

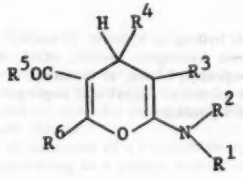
This application Nov. 25, 1974, Ser. No. 526,846

Claims priority, application Germany, July 19, 1972, 2235406

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 **64 Claims**

1. A pharmaceutical composition useful for effecting vasodilating action in humans and animals and for treating hypertension in humans and animals which comprises a vasodilating amount or an antihypertensive amount of a compound of the formula



wherein

R^1 and R^2 are the same or different and are each hydrogen or straight- or branched-chain lower alkyl;

R^3 is straight- or branched-chain lower alkyl, phenyl or —COOR′ wherein R′ is straight, branched or cyclic lower alkyl, lower alkenyl or lower alkynyl;

R^4 is phenyl unsubstituted or substituted by 1, 2 or 3 of the same or different substituents selected from the group consisting of lower alkyl, lower alkoxy, halogen, nitro, cyano, trifluoromethyl, carb(lower alkoxy) and —SO_n lower alkyl wherein *n* is 0, 1 or 2, or naphthyl;

R^5 is straight, branched or cyclic lower alkyl or —OR″ wherein R″ is straight, branched or cyclic lower alkyl, lower alkenyl or lower alkynyl or straight, branched or cyclic lower alkyl, lower alkenyl or lower alkynyl substituted by 1 or 2 oxygen atoms; and

R^6 is hydrogen or lower alkyl,

in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

3,974,291

FUNGICIDAL COMPOSITIONS FOR DERMATOMYCOSIS OF ANIMALS

Noritoshi Kitano, Tokyo; Fusao Kondo, Urawa; Kenichi Kusano, and Keijiro Ishibashi, both of Tokyo, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Dec. 11, 1974, Ser. No. 531,717
Claims priority, application Japan, Jan. 26, 1974, 49-11147
Int. Cl.² A61K *31/35*
U.S. Cl. 424—283 3 Claims

1. A method for the treatment of animal dermatomycosis caused by *Trichophyton verrucosum*, which comprises administering topically to an animal so infected a composition comprising an amount sufficient to inhibit said dermatomycosis of siccanin together with a dermatologically acceptable carrier therefor.

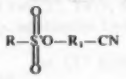
3,974,292

CYANOALKYL SULFONATES FOR THE CONTROL OF FUNGUS GROWTH

Kenneth P. Dorschner, Vienna, Va., and Robert P. Johnson, Baton Rouge, La., assignors to SCM Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 227,272, Feb. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 120,778, March 3, 1971, abandoned. This application Nov. 18, 1974, Ser. No. 525,007
Int. Cl.² A01N *9/14*
U.S. Cl. 424—303 4 Claims

1. A process for controlling the growth of fungi in soil, which comprises applying to said fungi an effective amount of a fungicidal composition comprising an agriculturally acceptable carrier and a cyanoalkyl sulfonate represented by the formula



wherein R_1 is an alkylene group having from 1 to 4 carbon atoms and R is an unsubstituted or substituted 1 to 12 carbon atom alkyl or cycloalkyl group wherein the substituents can be alkoxy, carboxy, alkoxycarbonyl, alkanoyloxy, oxo, halogen or nitro groups containing not more than 4 carbon atoms each.

3,974,293

NON-ADHESIVE CHEWING GUM COMPOSITION

Frank Witzel, Spring Valley, N.Y., assignor to Life Savers, Inc., New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,453
Int. Cl.² A23G *3/30*
U.S. Cl. 426—4 19 Claims

1. A chewing gum composition which will not adhere to artificial teeth, dentures and plastic filling material while substantially reducing denture odor, comprising a gum base comprising one or more elastomers; one or more hard waxes having a melting point above about 65°C, and which provide lubricity and slip properties to the gum base; one or more solvents for the elastomers, which have minimal tackifying properties; one or more hydrophilic-type detackifiers which absorb saliva and become slippery and are incompatible with the elastomer and solvent for the elastomer; one or more texturizing agents; one or more softening agents having a melting point above about 22°C; one or more emulsifiers which function as slip agents and impart hydrophilic properties to the gum base making same slippery on contact with saliva; and titanium dioxide in an amount within the range of from about 0.3 to about 1% by weight of the gum base, and a soluble phase comprising flavor and sweeteners.

3,974,294

PROCESS FOR THE PRODUCTION OF PROTEIN-CONTAINING FOOD ADDITIVES

Dieter Schwille, Heilbronn-Boeckingen; Hermann Seiz, Heilbronn; Ewald Sorg, and Udo Sommer, both of Herrenberg-Oberjesingen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Jan. 31, 1975, Ser. No. 545,886
Claims priority, application Germany, Feb. 6, 1974, 2405589
Int. Cl.² A23J *3/00*
U.S. Cl. 426—32 4 Claims

1. In a process for the preparation of easily wettable water-soluble products of natural proteins which have no bitter taste by enzymatic degradation of natural proteins, the improvement according to which protein selected from the group of protein sources consisting of whey, milk, soya, maize, potatoes, wheat, oilseed, nut kernal, sunflower kernal or egg

is subjected to hydrolysis in an aqueous suspension in the presence of gelatin, the mixture of said protein and gelatin being in a weight ratio of 10:1 to 1:10

and which said hydrolysis is accomplished by proteolytic enzymes of low activity from the group of pancreatic enzymes at a temperature between 40 and 60° and an optimum pH value for the activity of the proteolytic enzyme

and wherein said water soluble product has a flocculation temperature above 80°C.

3,974,295

PROCESS FOR PREPARING PROTEIN SUPPLEMENTED, FLAVORED INSTANT GRITS

Bruce G. Gralak, Carpentersville, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 408,863, Oct. 23, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,264
Int. Cl.² A23L *1/30*
U.S. Cl. 426—72 9 Claims

1. A process for producing a fortified nutritional emulsifier free, instant-type food product which upon the addition of water and without need for heating to boiling temperatures acquires the flavor and texture characteristics of cooked corn grits, said process consisting of the steps:

A. admixing
1. corn grits;
2. water, said water being added in an amount sufficient to cause the moisture content to be from 50 percent to 90 percent by weight of the total mixture;
3. an edible polysaccharide gum capable of rehydrating rapidly with the addition of water, said gum being added in an amount of from 0.5 to 3.5 percent by weight of the finished corn grits product; and
4. a mixture of vitamins and antioxidant until the total admixture is a slurry;

B. heating the above mixture in a first heating step, said first heating step comprising heating the mixture to a temperature of from 60°C. to 80°C. and maintaining that temperature for a period of time of from 30 seconds to 30 minutes without substantially gelatinizing the starch in the corn grits;

C. heating the above heated mixture in a second heating step, said second heating step comprising heating the mixture to a temperature of from 93°C. to 100°C.;

D. drying the heated mixture in the form of a thin sheet on a drum drier, said drying being substantially accomplished within a time period of up to 2 minutes after the mixture has been heated to the 93°C. to 100°C. temperature range;

E. collecting the dried sheet of product containing discrete particles in a starch-gum matrix and comminuting the dried sheet to form an instant-type corn grits product; and

F. forming a moist proteinaceous flavoring material by admixing: 1.) a proteinaceous material having more than

15 percent by weight protein therein, 2.) salt, and 3.) a moisturizing gravy mix; and

G. blending the moist proteinaceous flavoring material with the comminuted dry sheet until the blend is dry and with said proteinaceous flavoring material being added in an amount of from 1 percent to 15 percent by weight of the blended product.

3,974,296

SIMULATED EGG AND MEAT PET FOOD

Morris P. Burkwall, Jr., Barrington, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 234,990, March 15, 1972, abandoned, and a continuation-in-part of Ser. No. 389,477, Aug. 20, 1973, abandoned. This application May 20, 1974, Ser. No. 471,370

Int. Cl.[2] A23J *1/02, 1/08*

U.S. Cl. 426—104 **2 Claims**

2. A process for producing a shelf-stable, highly nutritious, simulated egg and meat pet food comprising:

a. first preparing a simulated egg portion by admixing to form a first mixture

I. from 1–35 parts by weight egg solids,

II. from about 5 to about 35 parts by weight of a member selected from the group consisting of sugar, sugar equivalents, and mixtures thereof,

III. from 1–30 parts by weight edible water absorbing hydrocolloid,

IV. from 10–30 parts by weight high protein binding agent,

V. sufficient water to give a moisture content of from 20–40 percent by weight,

VI. a sufficient amount of an acidic compound selected from the group consisting of at least one edible, food-grade, non-toxic acid; at least one edible food-grade, non-toxic acid salt, and mixtures thereof to adjust the pH of said first mixture to 4.5 to 7.0, and

VII. an effective amount of an antimycotic

VIII. with the first mixture having a water activity, A_w, of 0.70 to 0.90;

b. thereafter heating the first mixture to render it plastic; and

c. then forming the first mixture into an egg appearing shape of small strands to form said simulated egg portion;

d. forming a simulated meat portion by admixing to form a second mixture

I. from 10–50 parts by weight meat or meat by-products,

II. from 15–40 parts by weight of a member selected from the group consisting of sugar, sugar equivalents, and mixtures thereof,

III. from 10–40 parts by weight vegetable material,

IV. sufficient water to provide a moisture content of from 15–40 percent by weight,

V. an effective amount of an antimycotic, and

VI. a sufficient amount of an acidic compound selected from the group consisting of at least one edible, food-grade, non-toxic acid; at least one edible food-grade, non-toxic acid salt; and mixtures thereof to adjust the pH of said second mixture to 4.5 to 7.0,

e. forming the second mixture into a meat appearing shape of hamburger-like small strands to form said simulated meat portion, said simulated meat portion having a water activity, A_w, of from 0.70 to 0.90; and

f. admixing from 10–50 parts by weight of said simulated egg portion with from 50–90 parts by weight of said simulated meat portion to create said shelf-stable, highly nutritious, simulated egg and meat pet food.

3,974,297

PACKAGING RESINS

John B. Ott, Ashfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed July 19, 1974, Ser. No. 489,987

Int. Cl.[2] B65D *65/38;* **B29C** *17/07*

U.S. Cl. 426—106 **34 Claims**

1. In the process for preparing shaped packaging materials for foods, beverages and related substances from nitrile polymers containing from 55 to 85% by weight, based on the total polymer weight, of a nitrile monomer unit selected from the group consisting of acrylonitrile and mixtures of acrylonitrile and methacrylonitrile wherein the methacrylonitrile is present in amounts up to 16% by weight based on the total polymer weight, which process involves at least one forming operation comprising heating the polymer in an essentially solvent free condition to a molten state and shaping the polymer into a packaging material, the improvement which comprises having styrene oxide in intimate contact with the nitrile polymer before or during at least one of the forming operations wherein the polymer is heated to a molten state, said styrene oxide being employed in an amount sufficient to provide a shaped packaging material having an extractable HCN content below 50 parts per billion.

3,974,298

TREATMENT OF GRAIN

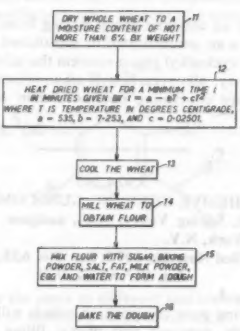
Stanley Peter Cauvain, High Wycombe; Donald Gordon Hodge, Chesham; David Donald Muir, Rickmansworth, and Norman James Harold Dodds, Chorleywood, all of England, assignors to Flour Milling and Baking Research Association, England

Filed Sept. 5, 1974, Ser. No. 503,310

Claims priority, application United Kingdom, Sept. 7, 1973, 42264/73

Int. Cl.[2] A23B *4/04*

U.S. Cl. 426—553 **9 Claims**


DRY WHOLE WHEAT TO A MOISTURE CONTENT OF NOT MORE THAN 6% BY WEIGHT
11
HEAT DRIED WHEAT FOR A MINIMUM TIME t IN MINUTES GIVEN BY t = a − bT + cT² WHERE T IS TEMPERATURE IN DEGREES CENTIGRADE, a = 535, b = 7·253, AND c = 0·02501.
12
COOL THE WHEAT
13
MILL WHEAT TO OBTAIN FLOUR
14
MIX FLOUR WITH SUGAR, BAKING POWDER, SALT, FAT, MILK POWDER, EGG AND WATER TO FORM A DOUGH
15
BAKE THE DOUGH
16

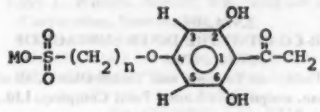
1. Process for the treatment of a wheat product in the form of whole wheat grains or an intermediate substance produced during the milling of wheat grains to obtain cake flour which process comprises the steps of drying said wheat product to a moisture content of 6% by weight or less, heating the dried wheat product at a temperature of from 100° to 140°C in the case of whole grains or from 100° to 200°C in the case of milling intermediates, holding the wheat product at this temperature at least for a period which is inversely related to the temperature and is not less than 1 hour at 100° C, and cooling the wheat product.

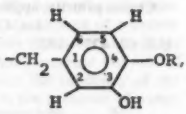
3,974,299
IONIC SWEETENER

Guy A. Crosby; Grant E. Dubois, and Ned M. Weinshenker, all of Palo Alto, Calif., assignors to Dynapol, Palo Alto, Calif.

Continuation-in-part of Ser. No. 486,282, July 8, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,522
Int. Cl.² A23L *1/22*
U.S. Cl. 426—548 17 Claims

1. A dihydrochalcone compound represented by the structural formula



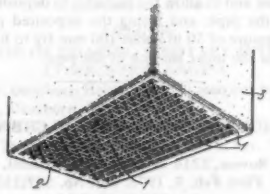


wherein *R* is a lower alkyl of from one to three carbon atoms inclusive, *n* is an integer of from one to three inclusive and *M* is a physiologically acceptable metal cation.

3,974,300
ICE CONFECTION

Clive Arnold Roberts, Oakley; Jennifer Joan Scott nee Reid, Wellingborough, and Michael John Willis, Bedford, all of England, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Feb. 27, 1975, Ser. No. 553,748
Claims priority, application United Kingdom, Mar. 1, 1974, 9396/74
Int. Cl.² A23G *9/00*
U.S. Cl. 426—565 4 Claims



1. An extruded novelty ice cream product containing longitudinal parallel air passages, the distance between nearest neighbour air passages being less than 5 centimeters and not less than 0.1 centimeter.

3,974,301
DEHYDRATED BANANA PRODUCT

Nancy N. R. Luh, Cambridge, and James K. Palmer, Sharon, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

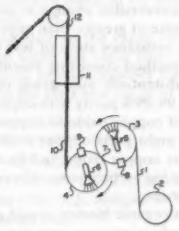
Division of Ser. No. 373,104, June 25, 1973, Pat. No. 3,879,568. This application Sept. 23, 1974, Ser. No. 508,186
The portion of the term of this patent subsequent to Apr. 22, 1992, has been disclaimed.
Int. Cl.² A23B *7/06*
U.S. Cl. 426—640 2 Claims

1. A dehydrated banana product stabilized against enzymatic discoloration, having the carpel portion of a banana exposed along the length of the product, said product having a substantial portion of the cellular structure of a whole banana, having a moisture content less than about 20%, and being substantially free of enzymic discoloration, and being rehydrateable to an edible product while retaining at least about 25% of the major constituents of a banana that characterize banana aroma and taste prepared by the process which comprises slicing a ripe banana lengthwise 1 to 3 times to form a plurality of banana slices having the carpel region exposed along their length to form slices having the relatively same size, contacting said slices with steam to increase the temperature of the interior of said slices up to about 85°C to 95°C for about ½ to 4 minutes, said slices being contacted with steam prior to said slices being substantially discolored due to enzymic discoloration, and dehydrating said steam blanched slices in a relatively dry atmosphere at a temperature from about 50°C to about 65°C for a period of time sufficient to reduce the water content of the banana slices to less then about 20 weight percent.

3,974,302
METHOD OF MAKING PATTERNED DRY RESIN COATED SHEET INSULATION

Edward J. Croop; Howard E. Saunders, both of Pittsburgh, and Dean C. Westervelt, Acme, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 26, 1974, Ser. No. 527,458
Int. Cl.² B05D *1/06*
U.S. Cl. 427—21 8 Claims



1. A method of making a patterned, porous, adhesive coated substrate comprising the steps of:

A. coating one side of moving flexible sheet material in a predetermined pattern with solid, dry, heat reactive adhesive resin particles having an average particle size of between about 1 micron to 2,000 microns, said adhesive resin pattern coating covering from about 10 percent to 90 percent of the sheet material area, wherein the resin is applied by an electrostatic coating means comprising at least one open patterned mask contacting the moving sheet material; and

B. heating the coated sheet material between about 65°C to 250°C, forming a discontinuous, patterned 0.25 mil to 25 mil thick dry coating of adhesive particles bonded to the sheet material, said adhesive pattern coating covering from about 10 percent to 90 percent of the sheet material area and adhering to it as resin projections above the sheet material surface.

3,974,303
METHOD FOR FORMING COATING FILMS

Seigo Iwase; Osamu Isozaki; Naozumi Iwasawa, and Tadashi Watanabe, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Filed July 22, 1974, Ser. No. 490,753
Claims priority, application Japan, July 27, 1973, 48-84169
Int. Cl.² B05D *3/06*; B05B *5/02*
U.S. Cl. 427—27 19 Claims

1. A method for forming coating films which comprises coating a powdery composition of a thermoplastic resin hav-

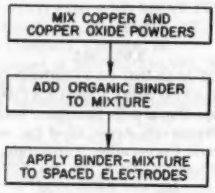
ing 0.5 to 3.5 polymerizable unsaturated bonds per 1000 of the molecular weight on an article to be coated, heat-melting the powdery resinous composition, and curing the molten film under application of ionizing radiation or ultraviolet radiation.

3,974,304

METHOD OF MAKING A VOLTAGE RESPONSIVE SWITCH

Roland T. Girard, Scotia; George A. Rice, Schenectady, and Arthur N. DeTommasi, Newtonville, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,725
Int. Cl.² B05D *7/00, 5/12*
U.S. Cl. 427—58 **6 Claims**



1. A method of making a voltage sensitive switch characterized by an irreversible change in resistance from a first high resistance state of greater than approximately 1 megohm to a second low resistance state of less than approximately 1000 ohms, said method consisting essentially of the steps of:

mixing substantially pure grade copper powder of approximately 99.99% purity with copper oxide powder in weight ratios of copper oxide to copper in the range of approximately eight parts copper oxide and one part copper to one part copper oxide and four parts copper, said powders having particle sizes of between approximately 1 and 30 microns;

adding an organic binder to said copper-copper oxide mixture; and

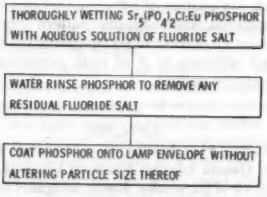
applying the resulting mixture to a pair of spaced electrodes.

3,974,305

TREATMENT OF $Sr_5(PO_4)_3Cl$:Eu LUMINESCENT MATERIAL TO IMPROVE FLUORESCENT LAMP WHICH USES MATERIAL

Jacob Van Broekhoven, North Caldwell, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 11, 1974, Ser. No. 478,549
Int. Cl.² H01J *61/35*
U.S. Cl. 427—67 **4 Claims**


THOROUGHLY WETTING $Sr_5(PO_4)_3Cl$:Eu PHOSPHOR WITH AQUEOUS SOLUTION OF FLUORIDE SALT
WATER RINSE PHOSPHOR TO REMOVE ANY RESIDUAL FLUORIDE SALT
COAT PHOSPHOR ONTO LAMP ENVELOPE WITHOUT ALTERING PARTICLE SIZE THEREOF

1. The method of improving the performance of a low-pressure, positive-column fluorescent discharge device having a elongated envelope and incorporating finely divided strontium chloroapatite activated by divalent europium as a luminescent material coating on the inner surface of said envelope, which method consists essentially of:

a. prior to envelope coating, thoroughly wetting said luminescent material with an aqueous solution of ionizable fluoride salt, wherein the fluorine ion in said solution is present in amount of from 0.2 gram to 50 grams per liter of water;

b. water rinsing said wetted luminescent material to remove any residual soluble fluoride salt therefrom; and

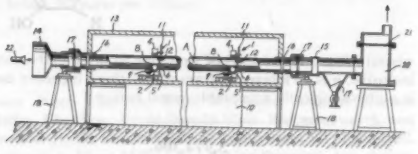
c. coating said rinsed luminescent material onto said envelope without altering the particle size of said luminescent material.

3,974,306

METHOD FOR COATING THE INNER SURFACE OF METAL PIPES

Keizo Inamura; Tadayoshi Tatsuno, and Toshio Okoshi, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Filed Oct. 4, 1973, Ser. No. 403,394
Claims priority, application Japan, Oct. 6, 1972, 47-100947
Int. Cl.² B05D *7/22, 3/02*
U.S. Cl. 427—183 **6 Claims**



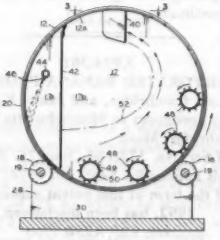
1. A method for coating the inner surface of a metal pipe having an inner diameter of about 1 to 15 cm, which consists essentially of feeding from one end of said metal pipe dry particles of a coating composition into the interior of the metal pipe preheated at a temperature of from a softening point of said coating composition to below a melting point thereof, sucking air at the same time from the other end of the metal pipe so as to form an air stream carrying the particles and flowing in the interior of the pipe at a flow rate of about 4 to 20 m/sec and to allow the particles to deposit on the inner surface of the pipe, and fusing the deposited particles at a reduced pressure of 30 to about 100 mm Hg to form a continuous film on the inner surface of the pipe.

3,974,307

METHOD FOR COATING WOOD CHIPS WITH RESINOUS LIQUID

Michael E. Bowen, 1216 Johnson Drive, Miami, Okla. 74354

Filed Feb. 5, 1975, Ser. No. 547,233
Int. Cl.² B05D *7/00*
U.S. Cl. 427—212 **8 Claims**



1. A method of coating a quantity of wood particles within an enclosure with a resinous liquid binder comprising:

coating an inner surface of a moving wall of said enclosure containing said quantity of particles with said resinous

liquid binder at a location on said wall upstream of said quantity of particles,

moving said wall beneath said quantity of particles within said enclosure and simultaneously wiping said particles across said coated inner surface to remove said resinous liquid from said inner surface and coat said particles.

3,974,308
METHOD FOR TREATING A DISPOSABLE SURGICAL DRAPE

Terry L. Winters, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

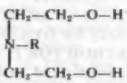
Division of Ser. No. 458,315, April 5, 1974, Pat. No. 3,902,484, which is a continuation of Ser. No. 223,090, Feb. 7, 1972, abandoned. This application June 10, 1975, Ser. No. 585,763

Int. Cl.² B05D *5/12*; **B32B** *5/18*

U.S. Cl. 427—244 **5 Claims**

1. A method for treating a normally hydrophobic, open-celled polyurethane foam for use on the surface of a disposable surgical drape or the like, to reduce the surface resistivity of the foam to less than 5×10^{11} ohms, increase the rate of fluid absorption thereof and minimize the tendency of the treated foam to lather when rubbed in the presence of water, comprising the steps of:

applying to the surface of the foam an isopropanol-water solution of the reaction product of a mineral acid and a fatty acid tertiary amine, said fatty acid tertiary amine being neutralized less than about 34% to form a fatty acid tertiary ammonium salt, said fatty acid tertiary amine having the structural formula:



wherein R signifies an alkyl group containing from 12 to 18 carbon atoms; said solution being applied in sufficient quantity to apply at least about 0.125 gms/yd² of said reaction product to the surface of said foam.

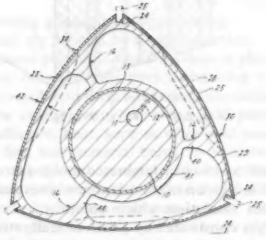
3,974,309
METHOD OF COATING A ROTARY INTERNAL COMBUSTION ENGINE

James C. Uy, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 428,530, Dec. 26, 1973, Pat. No. 3,888,606. This application Dec. 16, 1974, Ser. No. 533,368

Int. Cl.² C23C *13/02*

U.S. Cl. 427—250 **3 Claims**



1. A method of fabricating an insulated rotor for a rotary internal combustion engine, comprising:

1. preparing a rotor for a rotary internal combustion engine by conventional casting techniques and defining said rotor with triangularly related flanks, flat sidewalls, combustion pockets centralized in each of said flanks, and internal webbing effective to support said flanks and sidewalls on a hub with maximum reduction of mass,
2. providing a vapor deposition apparatus having at least two crucibles, one of which contains an adherent conductive metal for vaporization and the other containing an insulating medium vaporizable for providing an insulating coating, said apparatus having separate controls for communicating one or both of the vapors from said crucibles to a deposition chamber,
3. placing said prepared rotor in said chamber and sequentially coating said rotor with five distinct layers, the first layer consisting of said adherent conductive metal in a deposited thickness of between 0.0005–0.0015 inch,
4. while continuing to supply vapor of said adherent conductive metal to said deposition chamber, changing said controls to introduce simultaneously and gradually the vapor of said insulating medium to deposit a second layer consisting ultimately of an equal mixture of said adherent metal and said insulating medium, said second layer having a deposited thickness in the range of approximately 0.0003–0.001 inch,
5. eliminating vapor communication from said adherent metal and permitting solely the vapor of said insulating medium to deposit a third layer thereon in the thickness range of approximately 0.0005–01 inch,
6. while continuing to supply vapor of said insulating medium, simultaneously introducing the vapor from said conductive metal crucible to gradually deposit a fourth layer ultimately consisting of an equal mixture of insulating medium and conductive metal in the thickness range of 0.0005–0.0015 inch, and
7. eliminating communication of the vapor from said insulating medium so that solely the vapor from said conductive metal is introduced to said chamber for providing a final and fifth layer in the thickness range of 0.001–0.002 inch.

3,974,310
FLAME RETARDANTS FOR SYNTHETIC MATERIALS (I)

Vladimir Mischutin, Union City, N.J., assignor to White Chemical Corporation, Bayonne, N.J.

Continuation of Ser. No. 300,732, Oct. 25, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,895

The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.

Int. Cl.² C09K *3/28*; **C09D** *5/18*

U.S. Cl. 427—390 **10 Claims**

1. A method of rendering a disperse dyeable textile fabric of inherently flammable nature flame resistant, which comprises,

immersing said fabric in an aqueous suspension of a water insoluble organic brominated flame retardant compound, which compound melts above 100°C, is insoluble in water, and is in a state of subdivision in a range below about 2 microns in average particle diameter,

said immersion in water suspension being at a temperature of boiling and being long enough to have the textile fabric pick up said finely divided flame retardant compound and, thereafter, drying the material.

3,974,311
SHIPPING DOCUMENTS DEVICE

Phil Cherrin, Huntington Woods, Mich., assignor to Abe Cherrin and Lem Cherrin, Southfield, Mich., part interest to each

Division of Ser. No. 294,627, Oct. 3, 1972, Pat. No. 3,874,893, which is a continuation-in-part of Ser. No. 99,213, Dec. 17, 1970. This application Jan. 13, 1975, Ser. No. 540,698

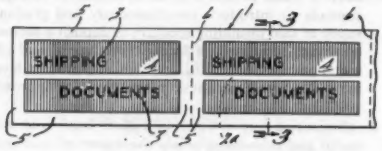
Int. Cl.² C09J *7/02*; **G09F** *3/02*, *3/04*, *7/12*

U.S. Cl. 428—43 **14 Claims**

1. An article for attaching documents and the like to the outside of containers, and for other uses, comprising: a sheet of materia; a first coating disposed on substantially the entirety of one side of said sheet, said first coating consisting of

a normally sticky adhesive material; a second coating disposed on said side of said sheet in a first area; and a third coating disposed on said side of said sheet in a second area, said first and second areas being spaced inwardly from the peripheral edges of said sheet, said second and third coatings each consisting of material which substantially removes the stickiness of said first coating, said second coating being of a predetermined coloring material, said third coating being of a visually contrasting material, one of said second and third coatings being in the form of reversely arranged indicia.

10. An article according to claim **1** in which said article forms a portion of a transparent tape product.



11. The product of claim **10**, wherein, the background color means which overlays the printed letters fully covers the adhesive material except for the border area of remaining sticky material.

12. The product of claim **10**, wherein, said tape product is prepared in the form of a roll of tape to facilitate usage thereof.

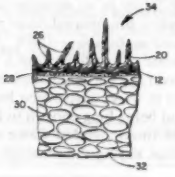
13. The product of claim **12**, wherein, said tape product is perforated at predetermined intervals such that one and more pieces of the tape can be easily severed for usage from the remaining tape.

3,974,312

ARTIFICIAL TENNIS-PLAYING COURT AND PROCESS

James Stevens, Marietta, and David K. Slosberg, Atlanta, both of Ga., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Filed June 9, 1975, Ser. No. 585,060
Int. Cl.² C08G *41/100;* B32B *5/16, 27/40*
U.S. Cl. 428—91 **28 Claims**



1. An artificial surface material which comprises:

a. a flat, woven, fiber-glass, base sheet material, one surface of which is characterized by a plurality of napped, generally upright, fine, glass fibers protruding therefrom;

b. a layer of a nonpermeable, abrasion-resistant resin forming a coating about the raised, napped, glass fibers and between the fibers to provide a rough, resin, fiber-coated, random face surface; and

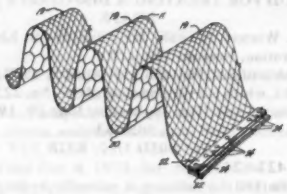
c. a backing sheet secured to the other surface of the base sheet.

3,974,313

PROJECTILE ENERGY ABSORBING PROTECTIVE BARRIER

Varnell L. James, Enumclaw, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 22, 1974, Ser. No. 499,767
Int. Cl.² B32B *3/28, 17/02*
U.S. Cl. 428—176 **36 Claims**



1. A projectile energy absorbing protective barrier comprising:

at least one flexible cloth layer formed of a plurality of tapes loosely woven together so as to allow sliding movement therebetween, each of said tapes being formed of flexible, relatively high tensile strength, low modulus of elasticity filaments; and,

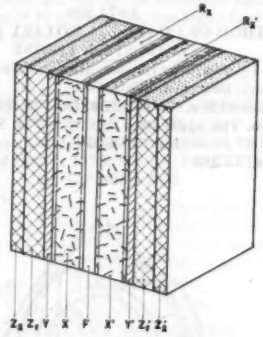
support means supporting said at least one cloth layer in an undulated configuration that will allow said layer to elongate when impacted by a projectile.

3,974,314

ELECTRICAL INSULATION PARTICULARLY FOR USE IN WINDING SLOTS OF DYNAMO-ELECTRIC MACHINES AND METHOD FOR ITS MANUFACTURE

Heinz Fuchs, Embrach, Switzerland, assignor to Micafil A.G., Switzerland

Filed Mar. 20, 1974, Ser. No. 453,169
Claims priority, application Switzerland, Mar. 29, 1973, 4568/73
Int. Cl.² H01B *17/60;* H02K *3/36;* B32B *5/02, 5/14*
U.S. Cl. 428—212 **1 Claim**



1. A stiff multi-layer laminated molded structure for use as electrical insulation in electrical machines and particularly for use in slot insulation which comprises a continuous inner planar layer constituted by a dielectrically strong temperature stable homogeneous insulating synthetic resin foil, an intermediate tangled fiber planar layer coextensive with and adhered to each side of said insulating synthetic resin foil by means of a thermosetting synthetic resin binding agent and an outer thermosetting glass fiber reinforced synthetic resin planar layer coextensive with and adhered to each of said intermediate tangled fiber layers, said resin binding agents penetrating

only the surface portions of each of said tangled fiber layers thereby leaving within each of the latter a core portion free from the binding agent for protecting said inner insulating synthetic resin foil against cracking due to imposed stresses.

3,974,315

CLOSED CELLULAR FUSED SILICA BODIES

Yorihiro Murata, North Tonawanda, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 388,688, Aug. 15, 1973, abandoned, which is a continuation of Ser. No. 137,627, April 26, 1971, abandoned. This application Apr. 1, 1974, Ser. No. 456,575

Int. Cl.² C04B *21/00, 35/14*

U.S. Cl. 428—212 5 Claims

1. A cellular fused body consisting essentially of SiO_2 and a fraction of boron nitride equivalent to from about 0.3 percent to about 3.0 percent by weight of boron oxynitride of the formula $BN_{1-m}O_m$ where m is a number from about 0.05 to about 0.3, having a bimodal closed cell matrix structure of

a. a multiplicity of primary closed cells having a mean size of from about 0.5 mm to about 5 mm; and

b. a multiplicity of secondary closed cells having a mean size not exceeding 10 microns in size; said cellular fused body having a bulk density of at least about 0.4 g./cc. and a thermal conductivity at 600°C of not greater than 0.00233 cal./sec./cm.²/°C/cm.

3,974,316

FIREPROOF GLASSWORK

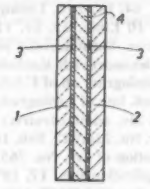
Francis Jacquemin, Monceau-sur-Sambre; Robert Terneu, Montignies-sur-Sambre, and Jean-Pierre Voiturier, Gerpinnes, all of Belgium, assignors to Glaverbel-Mecaniver, Watermael-Boitsfort, Belgium

Filed Mar. 28, 1974, Ser. No. 455,717

Claims priority, application United Kingdom, Sept. 17, 1973, 43539/73

Int. Cl.² B32B *17/06*

U.S. Cl. 428—215 14 Claims



1. A fire screening glazing panel comprising

a first structural ply formed by a vitreous sheet,

a second structural ply formed by a vitreous or plastic sheet,

a layer formed between said plies comprising a material which is convertible to form a thermally insulating barrier or porous or cellular structure when said panel is subjected to sufficient, heat, such as when said panel is subjected to a fire, said material being an hydrated salt selected from the group consisting of aluminates, plumbates, stannates, alums, borates, alkali metal silicates and phosphates, and protective stratum means located between said first structural ply and said layer of heat convertible barrier forming material for inhibiting interaction between said barrier forming heat convertible material and said structural ply, wherein said protective stratum means is selected from the group consisting of layers of polyvinylbutyal and polyurethane substantially water imprevious plastic sheets and coatings of anhydrous metal oxides and anhydrous aluminum phosphate.

3,974,317

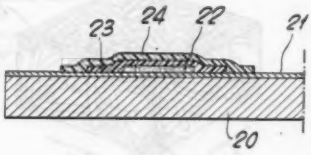
THERMOMETRIC COMPOSITIONS INCLUDING INERT ADDITIVES AND PRODUCTS

Edward N. Sharpless, Somerville, N.J., assignor to Ashley-Butler, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 375,873, July 2, 1973, abandoned. This application June 19, 1974, Ser. No. 480,672

Int. Cl.² C09K *3/34;* G01K *11/12;* G01N *31/22*

U.S. Cl. 428—215 13 Claims



1. A thermometric element comprising a plurality of separate compositions at least two of which have identical color arrayed in layers on an inert base, each layer from 15 to 125 microns in thickness, each separate composition being suitable for recording changes in temperature by a visual change in color and comprising a mixture containing:

a. a first cholesteric liquid crystal system characterized by exhibiting color in the cholesteric state at a first temperature and changing from that state to a second isotropic state exhibiting a different color at a second fixed temperature, at least two such systems being identical in separate compositions,

b. a second component other than (a) which is a chemically inert substance, miscible with said first system; the same second component but differing percents by weight thereof; being utilized in each composition wherein said liquid crystal systems are identical,

the differing amounts of said second component in each composition wherein the liquid crystal systems are identical being in a predetermined weight range wherein there is predictable variability in a curve in which the temperature at which said visual change in color takes place is plotted against percent by weight of said second component based on the total weight of said composition.

3,974,318

PRODUCT AND METHOD FOR FORMING IN SITU INSOLUBLE METAL SILICATES IN WOOD PORES FOR FIRE RETARDATION AND PRESERVATION

Allen G. Lilla, 1914 E. Washington St., Orlando, Fla. 32803

Filed Apr. 29, 1974, Ser. No. 465,551

Int. Cl.² B05D *3/10, 7/06*

U.S. Cl. 428—260 18 Claims

1. A method for treating a porous, flammable material having a plurality of internal voids, comprising the steps of:

applying an amount of a water soluble silicate composition to a surface of said material;

treating said material to drive said soluble silicate into said voids;

drying said water soluble silicate composition so as to make space for a water soluble metal salt within said internal voids;

applying an amount of said water soluble metal salt composition to a surface of said material;

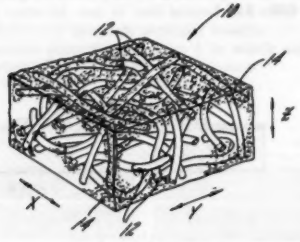
treating said material to drive said metal salt composition into said voids whereby said water soluble silicate and said water soluble metal salt react to form a hydrated, water insoluble metal silicate in said voids; and wherein

said water soluble silicate and said water soluble metal salt being in sufficient amounts such that said hydrated water insoluble metal silicate renders said material flame retardant.

3,974,319
ALL PURPOSE WIPE MATERIAL

Galib-bey Atam Alibeckoff, Lakewood, Ohio, assignor to Nylonge Corporation, Cleveland, Ohio

Filed Feb. 4, 1974, Ser. No. 439,589
Int. Cl.² A47L *13/16, 17/00*
U.S. Cl. 428—283 **7 Claims**



1. A soft, absorbent nonwoven material consisting essentially of a three dimensional web of an open array of long textile fibers, a fraction of which have substantial Z-direction orientation relative to the generally planar outer web surfaces and, based on the weight of the web, 10–50% regenerated cellulose, said regenerated cellulose being present as fragments randomly dispersed throughout the web with the concentration of regenerated cellulose being greatest on and adjacent to said outer web surfaces and of diminished concentration toward the web mid section, said fragments being adhered to said long fibers to, in combination with the Z-direction oriented fibers, unite the web into a coherent material.

3,974,320
SYNTHETIC LEATHER PRODUCT AND METHOD OF PRODUCTION

Klaus Gerlach, Obernau; Hans Jürgen Pitowski, Miltenberg, and Klaus Schneider, Erlenbach, all of Germany, assignors to Akzo N.V. of Arnhem, Holland, Wuppertal, Germany

Filed Aug. 6, 1973, Ser. No. 385,664
Claims priority, application Germany, Aug. 11, 1972, 2239541
Int. Cl.² D06N *3/14;* **B05D** *1/38*
U.S. Cl. 428—283 **15 Claims**

1. A synthetic leather consisting essentially of three superimposed and adherent, microporous elastomeric layers:

a. a base layer consisting essentially of a fibrous fleece or web impregnated and bonded with a polyurethane bonding agent;

b. an outer polyurethane cover layer essentially free of fibers and solid particles; and

c. an intermediate polyurethane layer lying between said fibrous base layer and said cover layer and containing 3 to 30% by weight, with reference to the polyurethane, of finely divided insoluble particles which have an individual volume of about 2×10^{-2} to 0.5×10^{-9} mm³., at least 85% of said particles exhibiting a dimension in the direction of greatest particle length of not more than 0.3 mm., said solid particles being distributed uniformly or gradually providing a continuous variation in density in proceeding from said base layer to said cover layer.

9. A method for the production of a synthetic leather consisting essentially of a fiber-reinforced multi-layer microporous elastomer, which method comprises:

first impregnating a fibrous web or fleece with coagulatable composition consisting essentially of a polyurethane solution or gel to provide a base layer;

beginning the coagulation of the polyurethane in said base layer;

applying to said base layer, before the polyurethane is completely coagulated in said base layer, a second polyurethane solution or gel as an intermediate layer which contains uniformly dispersed therein about 3 to 30% by weight, with reference to the polyurethane, of finely divided insoluble solid particles with an individual volume of 2×10^{-2} to 0.5×10^{-9} mm³., at least 85% of said particles exhibiting a dimension in the direction of greatest particle length of not more than 0.3 mm.;

thereafter completely coagulating the polyurethane of both said base layer and said intermediate layer by treatment with a non-solvent for the polyurethane, followed by washing and drying to complete the formation of a microporous structure in both layers; and

finally applying a polyurethane cover layer substantially free of fibers and solid particles onto said intermediate layer.

3,974,321
YARN SIZING PROCESS AND PRODUCT

Joseph J. Baron, Jr., Morris Plains, and Sherman Krefting, Teaneck, both of N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

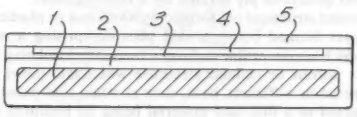
Filed June 20, 1974, Ser. No. 481,214
Int. Cl.² B32B *27/34*
U.S. Cl. 428—395 **6 Claims**

1. A process for preparing sized nylon yarn for use in a water jet loom comprising treating nylon yarn with an amount of synthetic size comprising an aqueous solution of a copolymer comprising from about 97% to about 85% by weight of methacrylic acid and from about 3% to about 15% by weight of acrylic acid, the amount of size being sufficient to size the yarn and thereafter drying the yarn so that the size adheres to the yarn, the sized yarn is water resistant and does not adhere to steel parts of the loom.

3,974,322
RADIOACTIVE SOURCE

Lidia Emelianovna Drabkina, ul. Gagarina, II, kv. 18, Gatchina Leningradskaya oblast; Jury Vatslavovich Mazurek, 2 Murinsky proezd, 44, kv. 145, Leningrad; Dmitry Nikolaevich Myascedov, 10 Linia, 23, kv. 11, Leningrad; Viktor Pavlovich Prokhorov, Shismarevsky per. 16, kv. 1, Leningrad; Vladimir Alexandrovich Kachalov, 2 Murinsky proezd, 44, kv. 26, Leningrad, all of U.S.S.R., and David Moiscevich Ziv, deceased, late of Leningrad, U.S.S.R. (by Valentina Spiridonovna Ziv, administratrix)

Continuation of Ser. No. 226,927, Feb. 16, 1972, abandoned, which is a continuation of Ser. No. 765,274, Oct. 2, 1968, abandoned. This application Dec. 17, 1973, Ser. No. 425,516
Int. Cl.² H05F *3/06*
U.S. Cl. 428—433 **3 Claims**



2. A radioactive source comprising a substrate, a priming enamel on said substrate, a finish enamel on said priming enamel, a radioactive material embeded in said finish enamel and forming a radioactive layer and a sealing layer coating said radioactive layer, said sealing layer consisting of a film of an oxide of one metal selected from the group consisting of titanium, tin, zirconium, aluminum and chromium.

3,974,323

METAL ARTICLE HAVING PROTECTIVE THIN FILM COATING AND METHOD OF APPLYING

Carl V. Brouillette, Liberty, Mo., and Harry Hochman, Oxnard, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1973, Ser. No. 417,339

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—457 23 Claims

1. A coated metal article comprising a metal substrate with a protective thin film coating thereon for inhibiting corrosion and oxidation of the metal surface due to elements in the atmosphere and in a marine atmospheric environment, comprising:

a. a coating of an amine compound adhered onto the surface of the metal substrate;

b. said amine compound coating being in the form of a photo-oxidative polymerized thin film cured on and bonded to the metal surface;

c. said cured coating being a thin film polymer/metal complex which is hydrophobic, and corrosion and oxidation inhibiting.

3,974,324

METHOD FOR MAKING POLYIMIDE COATED CONDUCTORS IN A CONTINUOUS MANNER AND PRODUCTS MADE THEREBY

John H. Lupinski, Scotia, N.Y., and James M. McQuade, Fort Wayne, Ind., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 265,535, June 23, 1972, Pat. No. 3,850,775. This application Aug. 15, 1974, Ser. No. 497,516

The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Int. Cl.[2] B01K *5/02;* C23B *13/00*

U.S. Cl. 428—458 1 Claim

1. A polyimide coated aluminum foil or aluminum strip which is the product obtained by continuously passing an aluminum foil or an aluminum strip into an electrocoatable polyamide acid salt bath having at least one other electrode at a different electrical potential then the aluminum foil or the aluminum strip and effecting the electrodeposition of polyamide acid onto said aluminum foil or aluminum strip from said electrocoatable polyamide acid salt bath which is a member selected from the class consisting of

A. a mixture of

i. particulated polyamide acid having less than 25 ppm of titratable chloride

ii. water

iii. aprotic solvent

iv. base

where the ratio of ii/iii can have a value of from 3.75:1 and (i) can be present at from 2 to 15 percent by weight of the mixture, and

B. a mixture of

v. polyamide acid

vi. water

vii. aprotic solvent

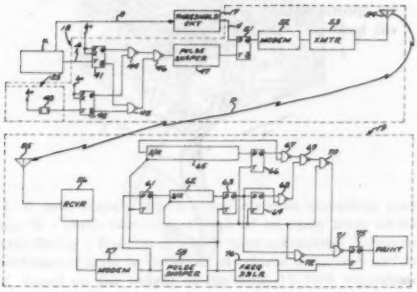
viii. base

where the ratio of vi/vii can have a value of from 0.5 to 3.75 and (v) can be present at from 2 to 15 percent by weight of the mixture, where said electrocoatable polyamide acid salt bath is being continuously maintained within the aforedescribed solid concentration and aprotic-water solvent ratios during the continuous electrocoating of said electrical conductor by the use of a membrane which is employed to isolate the cathode in the electrocoating bath, which is semipermeable during continuous electrocoating conditions to allow for the selective transport of base, water and aprotic solvent into the cathode compartment and substantially preventing transport of polyamide acid into such cathode compartment, while make up polyamide acid salt mixture is being continuously introduced into the bath.

3,974,325
INTERPOLATOR FOR FACSIMILE BANDWIDTH COMPRESSION

Michael E. Wilmer, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 21, 1974, Ser. No. 516,454
Int. Cl.² H04M 1/38
U.S. Cl. 178—6 **12 Claims**



1. In a scanning system adapted to sense the local reflectivity of a printed page at selected coordinates thereof, including a reflectivity scanner adapted for translation across said printed page, page translation means for advancing said page with each completion of a scanner translation, scanner return signal means for producing a signal indicative of each page advance, said scanner producing a binary scan signal of two distinct amplitudes corresponding to the local reflectivity of said printed page below or above a predetermined level of reflectivity, the improvement comprising:

clock means adapted to provide a series of pulses in integer relationship with the scanning translation of said scanner;

first divide-by-two means connected to receive said series of pulses from said clock means for providing a first complementary set of signal pulses changing in state upon receipt of every second one of said pulses from said clock means;

second divide-by-two means connected to receive said scanner return signal for producing a second set of complementary signal pulses changing in state upon receipt of every second one of said scanner return signals;

combining means connected to receive alternatively either the combination of said first and second signal pulses or the complements thereof and said scan signal for producing an output signal indicative of said scan signal upon preselected combinations of said pulse signals;

first shift register means operatively connected to said first divide-by-two means and said combining means for serially receiving said combining means output signal in synchronism with said first complementary set of signal pulses, and for shifting through to an output terminal at a predetermined pulse count delay of said combining means output signal;

buffering means connected to receive the output signal from said first shift register means, and said first complementary set of output signals for storing a predetermined combination thereof;

second shift register means connected to said buffering means and said first set of complementary signals for serially shifting through said buffering means output signals in syncrhonism with said first set of complementary signals to an ouput terminal at said predetermined pulse count delay;

logic means connected to receive the ouput signal from said buffering means and said second shift register means for producing an output signal when the chronologically adjacent signal pulses of said buffering means output signals are of equal amplitude or when said first shift register means input signal and said second shift register means output signals are of equal amplitude;

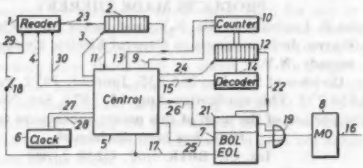
multiplying means connected to receive said first set of complementary signals for producing an output signal equal to an integer multiple thereof; and

second combining means for receiving the output signal from said logic means and said multiplying means and for producing an output signal indicative of a synchronized combination thereof, such output signal controlling the operation of said scanning system.

3,974,326
FACSIMILE COMMUNICATION SYSTEM

Hans G. Rosdolsky, Essen, Germany, and Heinrich Meyr, Los Angeles, Calif., assignors to Hasler AG, Bern, Switzerland

Continuation-in-part of Ser. No. 474,597, May 30, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,901
Claims priority, application Switzerland, June 8, 1973, 8423/73
Int. Cl.² H04N 7/12
U.S. Cl. 178—6 **2 Claims**



1. A facsimile communication system transmitting signals representative of the light values of a two-valued document comprising:

a transmitter (FIG. 1), having

a reader (1) for scanning said document line by line and having an output (23) delivering signals representing the light values along the scanned lines;

sampling means (2) for sampling said signals and obtaining a sequence of a predetermined number of binary pulses for each line, and having an input connected to the output (23) of said reader (1) and an output (11) delivering said pulse sequences;

a converter (10, 12, 14) for converting said pulse sequences into codewords;

means (7) for generating End-of-Line signals, and for transmitting for each line the codewords of the line and an End-of-Line signal;

a receiver (FIG. 2) having an input (31);

a reconverter (34, 40, 42) for reconverting the received codewords and having an output (44) delivering reconverted pulse sequences;

a first and second register (45, 46) each having an input and an output and a storing capacity corresponding to said pulse sequence;

a decoder (35) responsive to said End-of-Line signals and having an output (37);

a first control circuit (57) connected to said receive input (31) and to said output (37) of said decoder (35) and controlling said reconverter (34, 40, 42) to deliver a reconverted pulse sequence for each line;

switching means (70, 71, 72, 73) having an input connected to the output (44) of said reconverter (34, 40, 42) and having a first and a second switching position and connecting in said first switching position and output (44) of said reconverter (34, 40, 42) to the input of said first register (45) and simultaneously the output of said second register (46) to an output (74) of said switching

means (70, 71, 72, 73), and connecting in said second position the output (44) of said reconverter (34, 40, 42) to the input of said second register (46) and simultaneously the output of the first register (45) to the output (74) of said switching means (70, 71, 72, 73);

writing means (54) for two values tracing on a reproducing field line by line and having a first input connected to the output (74) of said switching means (70, 71, 72, 73) and receiving said pulse sequences for controlling the tracing value along each line, and a second input (68) for signals starting each line tracing;

an error detector (47, 59, 60) including a counter (47) connected to the output (44) of said reconverter (34, 40, 42) and counting the number of pulses of each pulse sequence and means (59) having an output (51) delivering a no-error signal if the counted number of pulses is equal to said predetermined number of pulses and means (60) having an output (52) delivering an error signal if the counted number of pulses differs from said predetermined number of pulses, and

a second control circuit (53) connected to said outputs (51, 52) of said no-error and error signals delivering means (59, 60) and to said switching means (70, 71, 72, 73), for changing in response to said no-error signal said switching means (70, 71, 72, 73) from one to the other of said first and second position and having an output connected to said second input (68) of said writing means (54) and delivering a signal on each of said no-error and error signals.

3,974,327

AUTOFOCUS CIRCUIT FOR A VIDEODISC PLAYBACK DEVICE

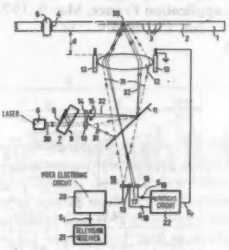
Ate Van Dijk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 555,198

Claims priority, application Netherlands, Dec. 23, 1974, 7416754

Int. Cl.² G11B *11/00*

U.S. Cl. 178—6.6 R **4 Claims**



1. An apparatus for reading a flat reflecting record carrier on which information is stored in an optically readable structure, comprising a radiation source means for supplying a read beam; an objective system for focussing the read beam on the plane of the information structure; a radiataion-sensitive signal detection system for converting the read beam after having been modulated by the information structure into an electrical signal; and an objective position control system, the objective position control system comprising focus detection means for providing an electrical focussing signal corresponding to the direction and magnitude of the deviation of the objective system from a predetermined distance from the information structure of the record carrier at which predetermined distance the read beam is focussed on the information structure, a signal controlled objective drive means for advancing the objective system toward the record carrier information plane from a rest position at a distance exceeding said predetermined distance to a position closer than said predetermined distance and for moving said objective system away from said record carrier, first signal controlled electrical means for selectively connecting said focussing signal to said objective drive means in response to a first timing signal, second signal controlled electrical means connecting said focus detection means to said drive means through said frist signal controlled electrical means for selectively amplifying the focussing signals that advance and move back the objective system in response to a second timing signal and for selectively amplifying and amplitude limiting only those focussing signals that advance the objective system in response to an absence of said second timing, signal, third signal controlled electrical means responsive to an absence of said second timing signal for selectively adding to said focussing signals an electrical bias signal that tends to advance the objective system at a substantially uniform rate toward the record carrier and for providing velocity feedback to said objective drive means through said first signal controlled electrical means, thereby advancing said objective system at a substantially fixed velocity in response to an absence of said second timing signal, and clock means for providing said first timing signal for said frist signal controlled electrical means and for concurrently providing an absence of said second timing signal for said second and third signal controlled electrical means to advance the objective system from said rest position toward said record carrier at a substantially fixed velocity and for providing said second timing signal at a time after the initiation of the first timing signal calculated to be such that the objective system is closer to the record carrier than said predetermined distance

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3,974,328

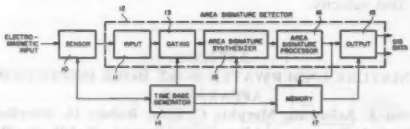
LINE SCAN AREA SIGNATURE DETECTION SYSTEM

Frank J. Thomas, and Max W. Farrow, both of Orlando, Fla., assignors to Martin Marietta Corporation, Orlando, Fla.

Continuation-in-part of Ser. No. 165,597, July 23, 1971, abandoned. This application Jan. 28, 1974, Ser. No. 437,406

Int. Cl.² F41G *7/00*; H04N *7/18*

U.S. Cl. 178—6.8 **42 Claims**



23. Apparatus comprising:

means for generating a current electronic signature of selected related portions of a field of view;

display means electrically connected to said current electronic signature generating means for displaying the field of view including the selected portions represented by said electronic signature;

means for storing a reference electronic signature; and,

means for correlating said current electronic signature with said stored reference electronic signature and for generating tracking signals responsively to the correlation whereby said electronic signature may be utilized both for tracking and display.

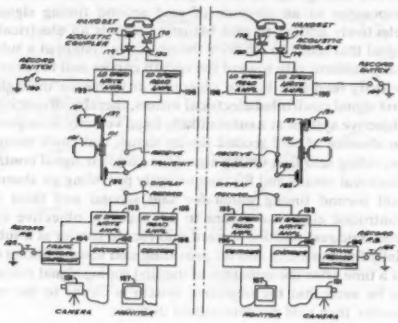
3,974,329
TRANSMISSION OF VIDEO PICTURES AT AUDIO FREQUENCIES

George E. Zenzefilis, 27 Los Vientos, Camarillo, Calif. 93010

Division of Ser. No. 418,477, Nov. 23, 1973, Pat. No. 3,881,188, which is a division of Ser. No. 177,194, Aug. 9, 1971, abandoned. This application Apr. 18, 1975, Ser. No. 569,447

Int. Cl.[2] H04N 5/79; G11B 5/012, 19/26

U.S. Cl. 178—6.8 10 Claims



1. The method of varying the time scale of an electrical signal comprising:

a. converting the electrical signal into a form suitable for recording on a magnetizable medium;

b. transducing the converted electrical signal to record a corresponding series of transitions between two discrete magnetization states on a magnetizable medium;

c. maintaining a first selected relative velocity between the transducer and the magnetizable medium during recording;

d. and thereafter reading the recorded transitions on the magnetic medium while maintaining a second selected relative velocity between the transducer and the magnetized medium; whereby the time scale is expanded when the second velocity is less than the first velocity and is compressed when the second velocity is greater than the first velocity.

3,974,330
MINIATURE UNDERWATER BORE HOLE INSPECTION APPARATUS

Burton J. Askowith; Merphis C. Ellis; Robert H. Oberlies; Frank A. Peterson, and Parmanand Prasad, all of Huntsville, Ala., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 585,004

Int. Cl.[2] H04N 7/18

U.S. Cl. 178—6.8 12 Claims

1. Survey apparatus for the inspection of an inner surface of an elongate hole having a major axis comprising:

electro-optical means for viewing said inner surface,

means including electrical signal transmission cable means for determining the position of said electro-optical means along said axis,

envelope means coupled to said electrical signal transmission cable means and forming therewith an elongate sealed envelope about said electro-optical means,

said sealed elongate envelope means having optically transparent cylindrical window means for orientation generally along said axis,

said electro-optical viewing means including:

reversible motive means supported within said sealed elongate envelope means,

hollow support means rotatable with respect to and within said sealed elongate envelope means generally about said axis by said reversible motive means,

light source means and cooperating tilted mirror means affixed within said hollow support means for illuminating a portion of said surface through an aperture in said hollow support means and through said transparent cylindrical window means,

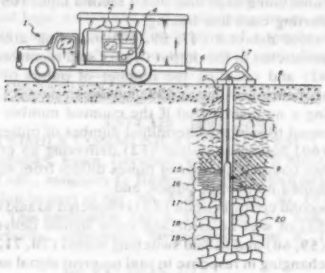


image tube means cooperating with lens means both supported within said hollow support means for forming an image of said illuminated inner surface on the image sensing surface of said image tube means, and

circuit means cooperating with said image tube means for transmitting timing and video signals via electrical leads within said electrical signal transmission cable means to remotely located utilization means.

3,974,331
LOW LIGHT LEVEL IMAGE PICK-UP TUBE ARRANGEMENT

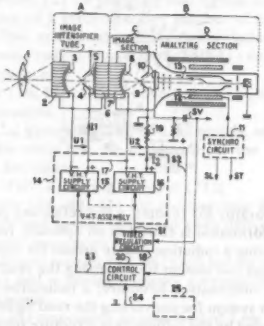
Christian Pepin, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 6, 1974, Ser. No. 467,470

Claims priority, application France, May 9, 1973, 73.16739

Int. Cl.[2] H04N 5/34

U.S. Cl. 178—7.2 10 Claims



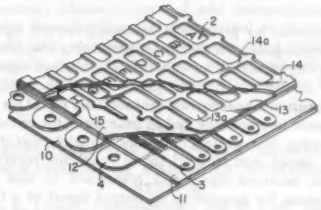
1. A low light level image pick-up tube arrangement comprising: optical means for focussing radiation received from an observed field; an image pick-up tube for receiving the said focussed radiation and for delivering a video signal, the said pick-up tube comprising image intensifying means which include a plurality of image intensifier stages in cascade, and electron gun means from which said video signal is derived by electronically scanning a target; very high voltage generating means for supplying said intensifier stages with supply voltages respectively; a mean level video signal regulation circuit receiving said video signal for providing a first control signal;

said first control signal providing through said generating means a variation of the supply voltage to at least one of the said image intensifier stages including the last one i.e., that preceding the said electron gun means, and, a control circuit receiving a signal proportional to the supply current of the said last image intensifier stage for providing a second control signal, said second control signal providing through said generating means a variation of the supply voltage to the input image intensifier stage; said generating means comprising means for receiving said first and second control signals respectively and for controlling the magnitude of the supply voltages which feed said intensifier means.

3,974,332
TABLET FOR USE IN A COORDINATE DIGITIZER

Kiyomi Abe, Noda; Yoshio Shishido, Soka; Genichi Tagata, Koshigaya; Tadaaki Sugino, Koshigaya, and Yoshiharu Yamashiro, Koshigaya, all of Japan, assignors to Pentel Kabushiki Kaisha, Japan

Filed Mar. 10, 1975, Ser. No. 556,980
Int. Cl.² G08C *21/00*; G06K *7/08*; G08B *5/36*
U.S. Cl. 178—18 **4 Claims**

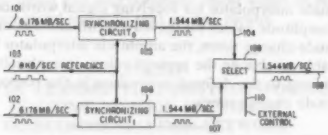


1. In a coordinate digitizer tablet of the type including a matrix of conductors comprised of a first group of spaced conductors disposed to define a first coordinate axis, and a second group of spaced conductors disposed to define a second coordinate axis, said first group and said second group of conductors being superposed and mutually oriented so that the conductors comprising said two groups cross to define lattice points of said matrix at the cross-over points of the respective conductors defining said matrix; and means mutually electrically insulating said conductors; said conductors sequentially receiving in operation electrical pulses which are sensed by capacitive coupling with the matrix to indicate the position on said matrix with respect to the coordinate axes to which the capacitive coupling is made; the improvement which comprises: an electrically conductive shield layer disposed overlying said matrix and defining an electrical shield, said shield having means defining therethrough apertures positioned to expose said lattice points and dimensioned to define unshielded segments of said matrix for capacitive coupling therewith and to substantially prevent capacitive coupling with other portions of said matrix thereby to substantially prevent sensing of electrical signals applied to the respective electrical conductors defining other lattice points of said matrix; means electrically insulating said shield from said matrix; and a surface insulative layer disposed on a major surface of said shield opposite said matrix.

3,974,333
ADAPTIVE SYNCHRONIZATION SYSTEM

Carl Jerome May, Jr., Holmdel, and Victor Basil Sorin, Matawan, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 24, 1975, Ser. No. 616,285
Int. Cl.² H04L *7/00*
U.S. Cl. 178—69.5 R **9 Claims**

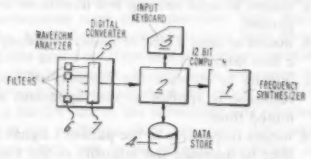


1. Apparatus for phase synchronizing a stream of clock pulses to a stream of reference pulses within a predetermined phase difference, the frequency of said clock pulses being a multiple of the frequency of said reference pulses, said apparatus being characterized by means for deriving from said stream of clock pulses a stream of synchronizing pulses having the frequency of said clock pulses, the pulse widths of said synchronizing pulses being of a duration greater than the pulse widths of said reference pulses by an amount determined by said predetermined phase difference, means for determining whether the pulse widths of said reference pulses are nested within the time domain of the pulse widths of said synchronizing pulses, and means responsive to the determining means for adjusting the phase of said stream of clock pulses until the pulse widths of said reference pulses are nested within the pulse widths of said synchronizing pulses.

3,974,334
WAVEFORM PROCESSING

David Cockerell, London, England, assignor to Electronic Music Studios (London) Limited, London, England

Filed Dec. 21, 1973, Ser. No. 427,266
Claims priority, application United Kingdom, Dec. 22, 1972, 59540/72
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1 SA **13 Claims**



11. A waveform synthesiser comprising digital waveform producing means including a plurality of storage zones and operable to produce in the zones respective series of digitally coded words representing in each series values of successive points of a waveform at a specific frequency within the audible range, the frequencies of the waveforms being distributed substantially throughout the audible range, means operable to combine the series from the zones to produce a series of words representing values of successive points of a composite waveform,

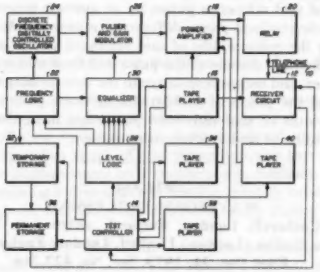
control means for controlling a parameter of the waveforms represented by at least some of said series of words, the words succeeding one another in each zone defining a sawtooth waveform, said synthesiser further comprising a waveform function store for storing in digital form the

amplitudes of successive points of a required waveform shape, the store having an addressing input connected to receive the words from successive ones of the storage zones to produce words defining the corresponding values of the waveforms with the shape of the required waveform in time-sharing fashion, the store providing unit waveforms and being connected to digital amplitude modulating means for giving the waveform values defined by control signals supplied to the modulating means, a digital, present value store for storing the present amplitude values of the modulating means, and a digital, amplitude interpolator for receiving digital words defining new amplitude values for the waveforms and associated amplitude change times, the amplitude interpolator being operable to change the present values in a plurality of increments to the defined new values in the respective amplitude change times.

3,974,335
HEARING TEST BY TELEPHONE INCLUDING RECORDED RESULTS

Vernon O. Blackledge, Scottsdale, Ariz., assignor to Richard Besserman, Scottsdale, Ariz.

Filed June 6, 1974, Ser. No. 476,884
Int. Cl.[2] H04R *29/00*
U.S. Cl. 179—1 N **9 Claims**



1. Means for providing a hearing profile from a remote point including a line over which audio signals may be passed, comprising,

a. means to send hearing test directions over said line to a patient;

b. means to send a tone of audio frequency over said line at a first intensity;

c. means to increase the intensity of said tone when no response is applied to said apparatus after a predetermined time;

d. means responsive to the patient's signal that he heard the tone to decrease the intensity of the tone;

e. said means to increase and to decrease the intensity of said tone including an up-down counter;

f. said counter having a plurality of fixed value outputs corresponding to preselected audio signal intensities;

g. means to cause said counter to count up in response to a first voltage signal, each said audio signal intensity being actuated successively in response to each first voltage signal to cause a successive increase in the intensity of said tone when no response is applied to said apparatus within said predetermined time and to count down in response to a second voltage signal, each said audio signal intensity being actuated successively in response to each second voltage signal to cause a successive decrease in the intensity of said tone when said patient signals that he heard the tone;

h. means to apply a tone of a different audio frequency over said line at different intensities;

i. means to record the frequencies and intensities thereof and the responses made thereto by the patient, whereby a hearing profile is produced;

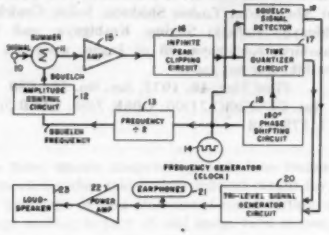
j. means to instruct the patient where to send for his hearing profile, and

k. means to send the patient and to record on said profile a code number identifying the profile.

3,974,336
SPEECH PROCESSING SYSTEM

Edward M. O'Brien, Story City, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 27, 1975, Ser. No. 581,164
Int. Cl.[2] H03G *3/26*
U.S. Cl. 179—1 SA **5 Claims**



1. Apparatus for processing an analog speech signal comprising: signal generator means for generating a squelch signal; summing circuit means for generating a summed signal representative of the sum of said speech signal and said squelch signal; circuit means receiving said summed signal for quantizing the same in amplitude and in time; detector circuit means for detecting the presence of said squelch signal in said summed signal; and tri-level signal generator receiving said quantized, summed signal and responsive to said detector circuit means for generating an output signal of a first level when said quantized signal is a speech signal of one level, and for generating an output signal of a second level when said quantized signal is a speech signal of a second level, and for generating an output signal of a third level when said detector circuit means detects the presence of a squelch signal in said summed signal.

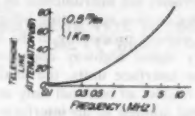
3,974,337
FM TELEVISION TELEPHONE SYSTEM

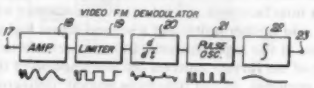
Yoshinobu Tatsuzawa, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 282,860, Aug. 22, 1972, abandoned, which is a division of Ser. No. 769,051, Oct. 21, 1968, Pat. No. 3,723,653. This application May 23, 1974, Ser. No. 472,664
Claims priority, application Japan, Oct. 24, 1967, 42-69116; Dec. 28, 1967, 43-79; Dec. 28, 1967, 43-81; Jan. 26, 1968, 43-4728; May 30, 1968, 43-37420; Aug. 8, 1968, 43-56894
The portion of the term of this patent subsequent to Mar. 27, 1990, has been disclaimed.
Int. Cl.[2] H04M *11/00;* **H04N** *7/10*
U.S. Cl. 179—2 TV **9 Claims**

1. A television-telephone system, comprising, in combination: a conventional telephone transmission line having a narrow band transmission characteristic; means for generating a video signal; means for generating a carrier wave signal having a frequency higher than and close to the maximum frequency of said video signal; means for frequency modulating said carrier wave by said video signal with a low index of modulation, such that the upper sideband portion of the modulated carrier is substantially the only portion of said modulated carrier wave which is not transmittable through said

transmission line; means for transmitting said modulated carrier wave through said transmission line, except for said upper side-band portion; and frequency demodulating means, including non-linear amplitude limiting means for reproducing said upper side-band and for compensating for irregularities in





the frequency characteristics of said transmission line and means for demodulating said transmitted modulated carrier wave with said reproduced upper side-band, whereby said video signal is transmitted through and reproduced from said conventional narrow band telephone transmission line.

3,974,338

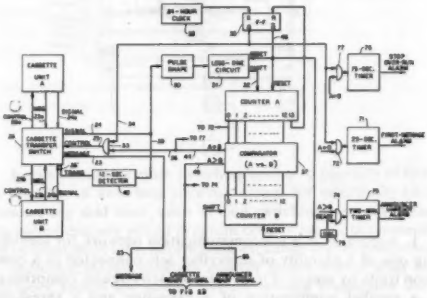
APPARATUS FOR AUTOMATIC MESSAGE REPROGRAMMING OF A MESSAGE ANNOUNCEMENT SYSTEM

Harman E. Luzier, Lawrenceville; Jon C. Colt, Tucker, and Douglas R. Cobb, Dunwoody, all of Ga., assignors to The Audichron Company, Atlanta, Ga.

Filed June 25, 1973, Ser. No. 373,086

Int. Cl.² H04M *11/10;* **G11B** *31/00;* **H04Q** *9/02*

U.S. Cl. 179—6 C **24 Claims**



1. Apparatus for selective substitution of a message initially delivered by a message announcement delivery system, comprising:

first means operative to repetitively provide a recorded initial message and to provide a commencement signal corresponding to the commencement of each such repetitive message;

second means selectively operative to deliver a recorded substitute message in response to a command signal;

control means operative at a predetermined time independently of said first and second means to provide a control signal corresponding to desired substitution of said substitute message for said initial message;

a message transfer circuit selectively connected between said first means and said second means and operative to supply said substitute message from said second means to said first means; and

substitution circuit means operative in response to said control signal and said commencement signal to provide said command signal to said second means.

3,974,339

METHOD OF TRANSMITTING DIGITAL INFORMATION IN A TIME-DIVISION MULTIPLEX TELECOMMUNICATION NETWORK

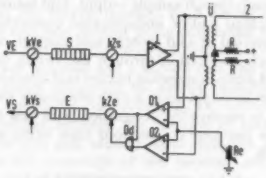
Karl-Anton Lutz, Munich, and Eberhard Knorpp, Gauting, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 17, 1974, Ser. No. 506,867

Claims priority, application Germany, Sept. 18, 1973, 2346984

Int. Cl.² H04Q *5/18*

U.S. Cl. 179—15 BS **4 Claims**



1. A method for transmitting digital data in a time-division multiplex telecommunications network over subscriber lines connecting digitally operating subscriber stations to a subscriber concentrator, comprising the steps of:

transferring data over two-wire subscriber lines in both transmission directions in a time-interleaved manner, alternatively and in the form of data bits, and

forming said data bits such that they have a duration substantially equal to the sampling intervals or a plurality thereof, taking into consideration the distance/velocity lags of transmission over said subscriber lines thereby forming the basis for transmission over time-division multiplex paths going out from said subscriber concentrator and coming in thereto, except for a tolerance time interval allowed for the period of the clock generators determining the bit rate in the subscriber sets relative to the period of the exchange clock generator determining the exchange clock rate in the terminal exchange connected to the subscriber concentrator.

3,974,340

DATA SWITCHING APPARATUS AND METHOD

Walter Ghisler, North Balwyn, Australia, assignor to L.M. Ericsson Pty Ltd., Australia

Filed Mar. 19, 1974, Ser. No. 452,674

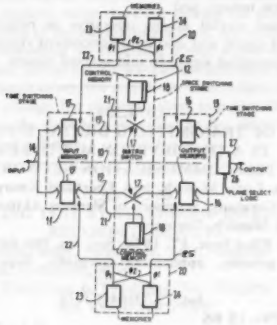
Claims priority, application Australia, Mar. 19, 1973, 2632/73

Int. Cl.² H04J *3/00*

U.S. Cl. 179—15 AT **11 Claims**

4. An apparatus for switching digital data in a telephone or data system, which system includes a switch having a plurality of similar inter-connected groups each having two planes for said data, said apparatus including means for setting up duplicated connections between any inlet and outlet of said switch

through the switch whereby the connections are made in both planes and/or setting up unduplicated connections between any inlet and outlet of said switch through the switch whereby the connections are made in only one plane, means for providing a plane select bit for switching through the switch with each speech sample in at least one of said planes, and a logical circuit at the switch output to receive each plane select bit and to be caused by said plane select bit to select which plane



provides each speech sample output, said means for setting up said duplicated and/or unduplicated connections includes a control external of said switch, said control causing duplication of each connection through the switch until congestion occurs and when congestion occurs said control causing a new connection to be set up in a path previously used for duplication so as to remove the congestion, said new connection and one of the previous connections then being unduplicated in said switch.

3,974,341

TELECOMMUNICATION EXCHANGE

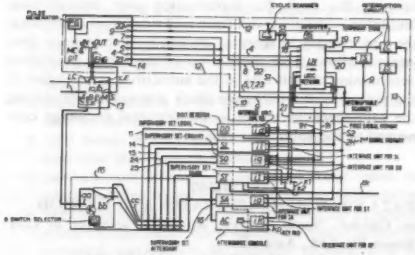
Roy Trueman, Toton; Colin Warsop, Beeston; Graham Godfrey, Wollaton, and John Malcolm Prestidge, Chaddesden, all of England, assignors to Plessey Handel und Investments A.G., London, England

Filed May 24, 1974, Ser. No. 472,453

Claims priority, application United Kingdom, May 31, 1973, 25903/73

Int. Cl.[2] H04Q *11/04*; H04M *3/22*

U.S. Cl. 179—18 J **3 Claims**



1. A telecommunication exchange which includes:

a switching network in which a call may be established; supervisory sets instrumental in establishing such a call; an interface unit corresponding to each supervisor set; a register having a register section corresponding to each interface unit, a section being capable of registering information relating to a call to be established; a logic network in which information relating to a call may be processed; a time-shared signal highway connecting the logic network and the interface units, a cyclic scanner which scans the register sections and the interface units, and once in each scanning cycle, effectively connects a scanned register section through the logic network and the time-shared highway to the interface unit to which the scanned register section corresponds, whereby signals may be passed between a supervisory set instrumental in establishing a call and a register section registering information about the call with or without processing in the logic network; and an auxiliary signal highway connecting the logic network and the interface units, the auxiliary highway being usable in respect of one call only at a time in response to a signal applied to an interface unit over the time-shared highway, said exchange also including further interface units; an interruptable scanner which scans the said further units; and a second signal highway terminated at the logic network, and connectable to a scanned one of the further units on the interruption of the scanner in response to an interrupt signal delivered by the scanned unit, said exchange further including a line circuit individual to each line served by the exchange, and a switching network or crosspoint switches; in which exchange, information relating to a calal to be established is signalled into a register section from a calaling line by way of the relevant line circuit, the switching network, an interface unit, the time-shared highway and the logic network.

3,974,342

SWITCHING ARRANGEMENT FOR TELECOMMUNICATIONS SYSTEMS

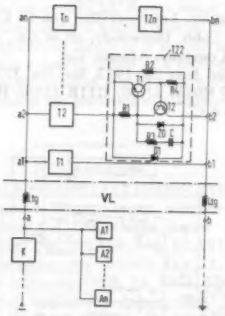
Karl Wagner, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 25, 1974, Ser. No. 509,061

Claims priority, application Germany, Sept. 27, 1973, 2348620

Int. Cl.[2] H04Q *3/24*

U.S. Cl. 179—18 FH **2 Claims**



1. Apparatus in a telecommunication network for identifying one of a plurality of subscriber sets connected to a common trunk by means of individual branch circuits, comprising:

a parallel combination of a capacitor and a threshold switching means, operable at a predetermined voltage level inserted in at least some of said branch circuits,

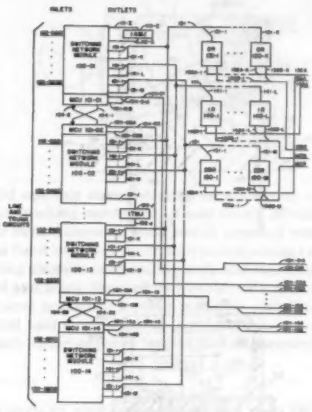
electronic switch means connected across each said parallel combination and operable to provide a shunt thereacross when the normal voltage feed is applied to said common trunk,

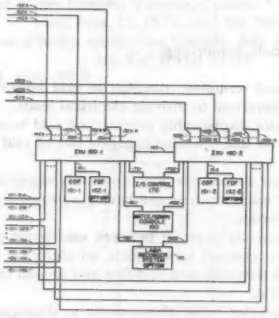
the voltage appearing across each said capacitor prior to operation of said electronic switch being indicative of the identity of the said subscriber set associated therewith.

3,974,343
SMALL MODULAR COMMUNICATIONS SWITCHING SYSTEM WITH DISTRIBUTED PROGRAMMABLE CONTROL

Thomas K. Cheney, Prospect, and Anatol Kuczura, Worthington, both of Ohio, assignors to North Electric Company, Galion, Ohio

Filed Jan. 10, 1975, Ser. No. 540,077
Int. Cl.² H04Q 3/54
U.S. Cl. 179—18 ES 16 Claims



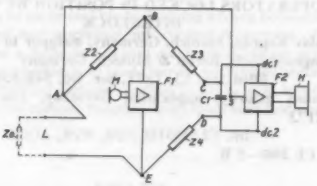


1. In a communication switching system, a plurality of lines, a plurality of switching network means for selectively interconnecting said lines, each of said switching network means including discrete stored program control means permanently associated therewith, information exchange means comprising a dedicated stored program control means and at least one memory means for storing system routing translation data, information transmission means connecting said information exchange means to said discrete stored program control means for said switching network means, a plurality of service circuit means, each of which is connected to each of said switching network means, and each of which includes a dedicated stored program control means permanently associated therewith, and means connecting said dedicated stored program control means of each of said service circuit means to said information exchange means for use in the establishment of a communication path over said switching network means.

3,974,344
ELECTRONIC SPEECH CIRCUIT FOR A CENTRAL BATTERY TELEPHONE SET

Laszlo Mersich, Tyreso, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Feb. 13, 1975, Ser. No. 549,664
Claims priority, application Sweden, Mar. 5, 1974, 7402901
Int. Cl.² H04M 1/58
U.S. Cl. 179—81 A 4 Claims

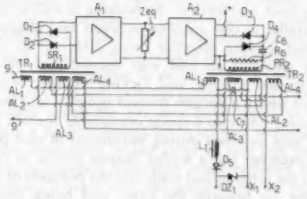


1. An electronic speech circuit for a central battery telephone set including a transmitter having a pair of DC-terminals for operating currents and a receiver amplifier having a pair of DC-terminals for operating current and a signal input terminal, said circuit comprising first and second input terminals adapted to be connected to a telephone line having a known impedance, first and second resistors connected in series, said first and second resistors each having a free end, the free end of said first resistor being connected to said first input terminal, a first impedor having a first end connected to said second input terminal and a second end, the impedance of said first impedor simulating the known impedance of the telephone line, means for connecting the DC-terminals of the transmitter amplifier between the junction of said first and second resistors and said second input terminal, means for connecting the DC-terminals of the receiver amplifier between the free end of said second resistor and the second end of said impedor, and means for connecting the signal input terminal of the receiver amplifier to one of said input terminals adapted to be connected to the telephone line.

3,974,345
NEGATIVE IMPEDANCE REPEATER WITH DOUBLE AMPLIFICATION, FOR TELEPHONE LINES

Cesare Valfré, Via Borgosesia 46 bis, 10145 Turin, Italy

Filed Nov. 29, 1974, Ser. No. 528,008
Claims priority, application Austria, Aug. 21, 1974, 6824/74
Int. Cl.² H04B 3/16, 3/36
U.S. Cl. 179—170 G 22 Claims



1. A negative impedance repeater for telephone lines operating at voice frequency, which comprises a first and a second amplifier unit serially connected, an equalizing network electrically coupled between the output of the first amplifier unit and the input of the second amplifier unit, the said first amplifier unit having its input terminals connected to the secondary winding of a first transformer the primary winding of which is connected to the telephone line, and the said second amplifier

unit having the output terminals connected to the ends of the primary winding of a second transformer the secondary winding of which is connected to the said telephone line, the said primary winding of the first transformer and the secondary winding of the second transformer being electrically interconnected with each other and with the telephone line.

3,974,346

PLURAL SWITCH ASSEMBLY HAVING INDEPENDENT OPERATORS LOCKED IN POSITION BY COVER INTERLOCK

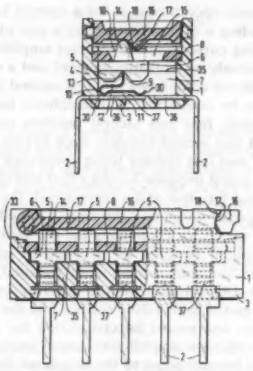
Jaroslav Keprda, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 13, 1975, Ser. No. 540,558

Claims priority, application Germany, Jan. 17, 1974, 2402173

Int. Cl.² H01H *3/20, 9/26, 13/04*

U.S. Cl. 200—5 B **5 Claims**



1. A switching device comprising: a plurality of independently operable switches arranged for parallel movement between activated and deactivated positions, said switches received in a common housing, a single locking member associated with said housing selectively actuatable to simultaneously lock all of said switches each in one of said positions, the housing being substantially tub shaped having longitudinal walls and end walls, the plurality of switches being located interior of said housing having portions thereof projecting towards an open end of said housing, said portions being movable back and forth in the housing in a direction of movement parallel to one another between said longitudinal sidewalls, said locking member being attached to said housing member adjacent an end wall thereof and pivotable with respect to said housing, said locking member being pivotable to a point where a portion thereof projects into the interior of said housing and into a space occupiable therein by said portions of said switches during movement of said portions, the locking member has a wedge shaped profile in cross section between the longitudinal walls and the portions of the switches projecting up towards the open end being provided with chamfered sidewalls dimensioned with respect to the wedge shaped profile to provide a camming contact between the locking member and the portions upon movement of the locking member to its locking position, the switches have a portion thereof intermediate top and bottom ends thereof extending outwardly therefrom and entrapped between top sides of divider walls positioned within said housing projecting from a bottom thereof towards the open end thereof and an intermediate plate positioned in said housing with a bottom surface spaced from the top surface of the divider walls.

3,974,347

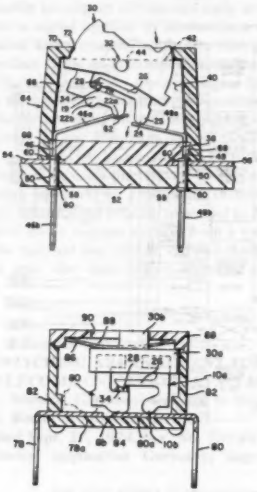
SWITCH ASSEMBLY HAVING ROTATABLE, PIVOTED OR SLIDABLE ACTUATOR AND DIODE STRUCTURE MOUNTED BETWEEN ACTUATOR CONTACTS

Joseph Larue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 10, 1975, Ser. No. 556,742

Int. Cl.² H01H *11/58, 15/06, 21/18*

U.S. Cl. 200—6 R **7 Claims**



1. A diode switch, comprising:

a housing,

a pair of spaced terminals mounted in said housing and depending therefrom to provide electrical leads,

a switch operator displaceably mounted on said housing,

a first contact on said operator engaging one of said terminals,

a second contact on said operator removably engageable on the other of said terminals and having a projecting resilient beam portion,

a diode permanently press fit between said beam portion and said first contact to complete an electrical circuit through said terminals and said first and second contacts and said diode,

said switch operator being displaceable to disengage said second contact from a corresponding one of said terminals to interrupt said circuit.

3. The structure as recited in claim **1**, wherein, said operator is slidably mounted on said housing.

4. The structure as recited in claim **1**, wherein, said operator is pivotably mounted on said housing.

3,974,348

REVERSING SWITCH CONTROLLED BY A SAFETY LOCK HAVING A CYLINDRICAL BARREL

Paul Lipschutz, Croissy-Sur-Seine, France, assignor to Societe d'Exploitation des Brevets Neiman SA, Courbevoie, France

Filed Jan. 23, 1975, Ser. No. 543,212

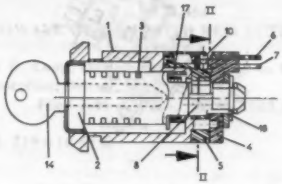
Claims priority, application France, Feb. 14, 1974, 74.04952

Int. Cl.² H01H *27/00*

U.S. Cl. 200—44 **8 Claims**

1. A switch comprising a lock, said lock having a stator, a cylindrical barrel rotatable within said stator about a first axis, an operating element integral with said barrel, said element

extending parallel to and being offset from, said axis, a movable switch actuating element, switch contact means mounted on and movable with said actuating element, means mounting said switch actuating element for rocking movement about a second axis parallel to and offset from both said first axis and said operating element, said switch actuating element having an opening therein and said operating element always extending into that opening and coacting with marginal edges defining said opening during turning movement of said barrel to produce rocking movement of said switch actuating element, a fixed switch element, fixed switch terminal means mounted on said fixed switch element, said switch contact means of said actuating element cooperating with said terminal means, said second axis being disposed on one side of a diametral plane of said barrel normal to a plane including said first and second axes and said contact means and said terminal means being disposed on the opposite side of said diametral plane.

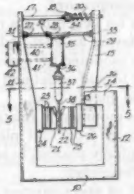


3,974,349

CIRCUIT BREAKER WITH AUTOMATICALLY ADJUSTABLE CONTACT PRESSURE

Karl D. Olafsen, Mosby, Norway, assignor to Falconbridge Nickel Mines Limited, Toronto, Canada

Filed June 13, 1975, Ser. No. 586,764
Claims priority, application Canada, July 2, 1974, 203793
Int. Cl.² H01H *35/38*
U.S. Cl. 200—82 R **13 Claims**



8. An electric switch comprising,

a frame having an extended arm and a shorter arm,

a lever pivotably connected to the end of said shorter arm, a first end of said lever on one side of the pivotal connection being substantially opposite the end of said extended arm and a second end of the other side of said pivotal connection,

a first contact member mounted on said extended arm and insulated therefrom,

a second contact member mounted on said second end of said lever and insulated therefrom,

said first and second contact members being positioned opposite one another,

a mechanical linkage comprising two end links and a middle operating link pivotably connected to one another, the free end of one of said end links being pivotably connected to said extended arm and the free end of the other end link being pivotably connected to said lever at the first end thereof,

spring means engaging said extended arm and said lever at the first end thereof biasing said second contact member towards said first contact member and biasing said mechanical linkage to a condition of maximum extension,

a switch blade movable between a first position between and in contact with said first and second contact members and a second position disengaged from said contact members,

means to move said blade between said first and second positions, mounted on said operating link and connected to said blade,

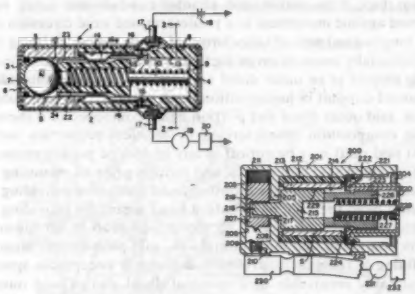
said means to move said blade applying a force between said blade and said operating link causing movement of said blade and a deflection of said mechanical linkage according to the resistance to blade movement, the deflection of the mechanical linkage tending to move said lever and said second contact member away from said first contact member.

3,974,350

GAS DAMPED VEHICULAR CRASH SENSOR WITH GAS BEING DOMINANT BIASING FORCE ON SENSOR

David S. Breed, Boonton, N.J., assignor to Breed Corporation, Fairfield, N.J.

Filed July 24, 1974, Ser. No. 491,291
Int. Cl.² H01H *35/14*
U.S. Cl. 200—61.53 **16 Claims**

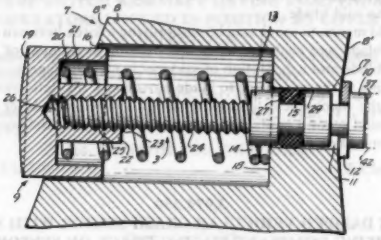


1. A gas damped sensor adapted to be mounted on a vehicle having a normally inactive passenger protective device for sensing deceleration above a predetermined threshold of such vehicle, said sensor comprising a sealed housing containing a gas; means defining a cylinder in said housing; sensing means mounted in said cylinder for movement in one direction from a normal position in response to deceleration of the vehicle, said sensing means and said cylinder having a clearance therebetween through which the gas may flow; yieldable biasing means exerting a predetermined force on said sensing means and preventing movement of the latter in said one direction from said normal position until said predetermined force of said biasing means is overcome; operating means for operating said device; and actuating means coupled to said operating means and responsive to movement of said sensing means a predetermined distance in said one direction from said normal position to actuate said operating means, the clearance between said cylinder and said sensing means being of such size that gas flow through said clearance is viscous and said gas is enabled to exert a damping force on said sensing means which dominates the force of said biasing means over a substantial portion of the movement of said sensing means in said one direction.

3,974,351
WRIST WATCH PUSH-BUTTON DEVICE

Irving Solov, 61-04 - 218th St., Bayside, Long Island City, N.Y. 11364, and Hyman Dinstman, 115 Central Park West, New York, N.Y. 10023

Filed May 16, 1975, Ser. No. 578,198
Int. Cl.² H01H *3/12;* **G04C** *3/00*
U.S. Cl. 200—159 R **6 Claims**



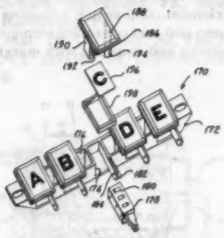
1. Push-button device comprising in combination: a first support structure defining a through-aperture, the first support structure having inner and outer faces, and said through-aperture including a channel-conduit defined extending between and opening through said inner and outer faces; shaft means for providing an axially movable lever for mounting within said channel-conduit, said shaft means including an elongated shaft extending through an inner port through said inner face from within said channel-conduit and being retained against movement in a predetermined axial direction of its longitudinal axis of said elongated shaft, said shaft being of substantially constant cross-sectional area along a longitudinal axis thereof at an outer distal end portion thereof within said channel-conduit in juxtaposition to an outer port in said outer face, said outer distal end portion being composed of a shearable composition characterized by physical properties such that said shaft may be cut-off at any of desired predetermined points along said outer distal end portion prior to mounting a button head thereon; push-button head means for providing a button head thereon; push-button head means for providing a button head to be pushed to move said shaft in an inward direction along said longitudinal axis, said push-button means defining a receptacle structure defining a receptacle space mountably receivable of a terminal distal end of said outer distal end portion; and spring means for biasing said shaft in an outer direction into said retained being, such that upon pressing inwardly upon said push-button means and thereafter releasing, said shaft and said push-button head means each respectively return to positions held prior to pressing inwardly upon the push-button means.

3,974,352
SWITCH ASSEMBLY MODULE WITH INSERTABLE ACTUATORS AND SWITCHES

Irving Pitel, Edison; Richard S. Silverman, Springfield, and Richard J. Mueller, Mountain Lakes, all of N.J., assignors to Rowe International Inc., Whippany, N.J.

Division of Ser. No. 454,118, March 25, 1974. This application Jan. 15, 1975, Ser. No. 541,285
Int. Cl.² H01H *13/04*
U.S. Cl. 200—293 **7 Claims**

1. In a merchandising machine, a manually disassemblable push-button and switch unit assembly including a frame formed with a recess providing a side opening and a top opening, a switch unit having an element accessible externally of said unit for operating said switch unit, said switch unit adapted to be assembled in said frame recess through said side opening with said element accessible through said top opening, first manually operable interengageable means on said frame and on said switch unit for releasably retaining said switch unit in said recess, a push-button, second manually operable interengageable means on said frame and on said push-button for releasably mounting said push-button on said

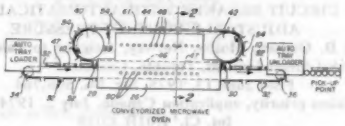


frame over said top opening in engagement with said actuating element and for limited movement toward and away from said switch unit to actuate said actuating element.

3,974,353
CONVEYORIZED MICROWAVE OVEN

Costas E. Goltsos, Weston, Mass., assignor to Teckton, Inc., Wellesley, Mass.

Continuation-in-part of Ser. No. 361,404, May 18, 1973, abandoned. This application Aug. 26, 1974, Ser. No. 500,300
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 A **13 Claims**



1. An apparatus for simultaneously and selectively heating food by radiant energy comprising:

an oven having means for generating a radiant energy field therein, said oven having an inlet and an outlet end;

lower conveyor means mounted for movement through said oven from said inlet to said outlet and along a path which extends through said energy field;

upper conveyor means mounted in relation to said oven for movement therethrough from said inlet to said outlet and along a path substantially parallel to said lower conveyor means but spaced therefrom;

means carried by each of said conveyor means for defining a sequence of radiation opaque regions disposed along each of said conveyor means, said radiation opaque regions being equally spaced on each of said upper and lower conveyor means;

means forming at least one radiation transparent opening in each of said radiation opaque regions, the arrangement and configuration of the openings in said opaque regions on said upper conveyor means and said lower conveyor means being such that an opaque region on said upper conveyor means and an opaque region on said lower conveyor means may be aligned at least generally with their apertures being at least in overlapping relation; and

means for advancing both said conveyor means in the same direction and in synchronized unison in which said opaque regions carried by the adjacent portions of the said conveyor means may pass through said energy field in said at least general alignment with each other and with their radiant transparent openings in said at least overlapping relation with each other.

11. A method for heat conditioning a food item comprising:

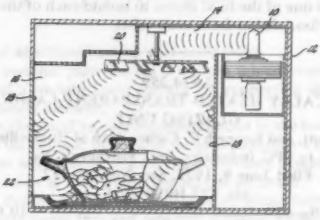
providing a field of radiant energy to heat said food item;
conveying said food item through said energy field;
embracing said food item as it enters said energy field with a shield and conveying said shield through said energy field in unison with said food item, said shield being at least partly transparent to said radiation; and
separating said food item from said shield as said food item exits from said energy field.

3,974,354

MICROWAVE UTENSIL WITH REFLECTIVE SURFACE HANDLE

George B. Long, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed June 4, 1975, Ser. No. 583,543
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 E **4 Claims**



1. In a microwave oven having reflective walls and including a magnetron and a stirrer for randomly distributing microwave energy from said magnetron toward said walls and throughout said oven, the improvement comprising a utensil in said oven having an open top dish for supporting food to be cooked by said microwave energy and a cover closing said open top, said dish being formed of a ceramic container portion with a pair of integral handle portions and being homogeneously lossy throughout all said portions for browning the food, said cover being formed of a ceramic container portion with an integral handle portion and being homogeneously lossy throughout all said portions for browning the food, a first coating of reflective shield material on the handle portions only of said dish and said cover reflecting microwave energy in said oven away from said handle portions to prevent heat buildup in said handle portions due to said microwave energy, and a second coating of heat insulating material on said handle portions coextensive respectively with each of said first coatings, said second coating having the characteristic of low heat conductivity to maintain said handle portions cool to the touch in the event there is a heat buildup in said handle portions due to conduction from said container portions of said utensil.

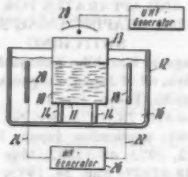
3,974,355

METHOD FOR EFFECTING UNIFORM HEATING OF AN ORGANIC PRODUCT PARTICULARLY FOR THE PURPOSE OF PRESERVING THE PRODUCT AND APPARATUS THEREFOR

Jean Bach, Waldstrasse 19, 8032 Munich-Grafelfing, Germany

Filed May 6, 1975, Ser. No. 575,016
Claims priority, application Germany, May 9, 1974, 2422530
Int. Cl.² H05B 9/04
U.S. Cl. 219—10.81 **34 Claims**

1. A method for effecting a uniform heating, particularly for the purpose of preserving, of an organic product located in a closed container in which a gas occupies the space inside the container above the product, comprising the steps of immersing the container into a liquid having a low dielectric loss factor to such an extent that the liquid level is somewhat below the upper side of the product in the container; using electrodes located to either side of the container to pass through the container from one side thereof to the other a first high-frequency electromagnetic alternating field having a respective first frequency such that the penetration depth of said first field is at least as great as the width of the container;



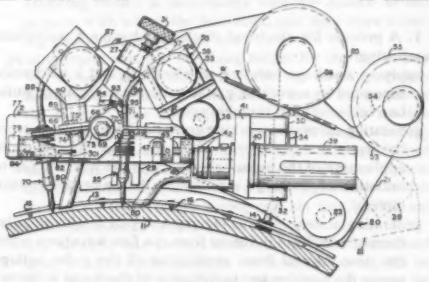
from that side of said container at which the gas filled portion thereof is located passing into the container through the gas and into the adjoining portion of the product a second high-frequency electromagnetic alternating field having a respective second frequency such that the penetration depth of the second field is small compared to the penetration depth of the first field.

3,974,356

MULTIPLE ARC WELDING DEVICE AND METHOD

Jerome W. Nelson, and James B. Randolph, both of Houston, Tex., assignors to CRC-Crose International, Inc., Houston, Tex.

Filed Aug. 26, 1974, Ser. No. 500,688
Int. Cl.² B23K 9/02
U.S. Cl. 219—60 A **13 Claims**



1. An apparatus for forming an arc welded girth joint in sequential welding passes in a weld plane between the adjacent ends of annular work pieces of similar diameters, such as lengths of pipe in pipelines and the like, wherein consumable electrode material is fused by the arc and deposited in a gap or kerf between said adjacent ends in the presence of a protective shielding means, the improvement which comprises the following, in combination:

a. A main welder frame and means for guiding said main frame in orbital travel around the work pieces at said weld plane,
b. A pivoted subframe secured to said main frame and adjustable with respect to said main frame for pivotal movement transversely of said weld plane,
c. A leading welding head mounted on said pivoted subframe and a follower welding head carried by a cantilever secured to said leading head, said cantilever being angularly adjustable with respect to said leading head for positioning the follower head adjustably with respect to the work surface of said work pieces,
d. Means on the subframe for adjusting each of said welding heads about a pivot point to maintain a fixed head angle

with respect to the work surface, regardless of diameter of said work pieces, and

e. Separate and independent means on the subframe for supplying electric current and consumable electrode material to the individual welding heads.

3,974,357

PROCESS AND APPARATUS FOR ELECTRICAL DISCHARGE SHAPING USING SEQUENTIAL SWITCHING

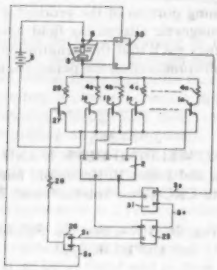
Nagao Saito, Nagoya; Kazuhiko Kobayashi, Seto, and Toshiro Oizumi, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1974, Ser. No. 446,727

Claims priority, application Japan, Mar. 22, 1973, 48-32882; Mar. 22, 1973, 48-32882; May 9, 1973, 48-51426; May 9, 1973, 48-51427; Aug. 24, 1973, 48-94954

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 M 7 Claims



1. A process for electrical discharge shaping a workpiece comprising:

applying a voltage between an electrode and a workpiece separated by a working gap to generate a discharge pulse current waveform therebetween,

generating across the working gap a discharge pulse current having a first waveform when the time interval from application of the pulse voltage across the working gap to initiation of discharge is no longer than a predetermined interval,

generating across the working gap a sloped discharge pulse current waveform different from the first waveform when the time interval from application of the pulse voltage across the working gap to initiation of discharge is shorter than the predetermined interval,

sequentially switching a plurality of semiconductor elements in the discharge circuit to generate across the working gap the first waveform and the sloped discharge pulse current waveform different from the first waveform.

3,974,358

PORTABLE FOOD HEATING DEVICE

Costas E. Goltsos, Weston, Mass., assignor to Teckton, Inc., Wellesley, Mass.

Filed Jan. 10, 1975, Ser. No. 540,080

Int. Cl.² F27D *11/02*

U.S. Cl. 219—387 13 Claims

1. A heating device for simultaneously heat conditioning a plurality of foods comprising:

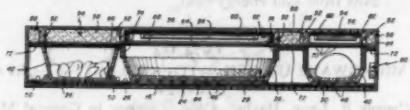
a portable box having upper and lower thermally insulating sections;

a resistance heating element in the lower section;

an infrared radiant heating element in the upper section;

means for retaining a plurality of food bearing dishes in the box, in a manner in which at least one of the food bearing dishes is disposed between the resistance and infrared heating elements and in heat conductive relation with the resistance heating element;

shielding means carried by the upper section and located as to be disposed between the infrared heating element and said one of said food bearing dishes for controlling the



quantity of radiation to which the food in said food bearing dish is exposed; and

means on the upper section for engaging the upper rim of at least one of the food dishes to isolate each of the foods in the food dishes from each other.

3,974,359

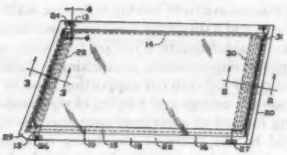
ELECTRICALLY HEATED TRANSPARENT LAMINATED GLAZING UNIT

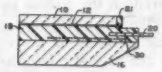
Dee R. Orcutt, and Kenneth C. Collier, both of Huntsville, Ala., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 9, 1975, Ser. No. 585,417

Int. Cl.² H05B *3/06*

U.S. Cl. 219—522 10 Claims



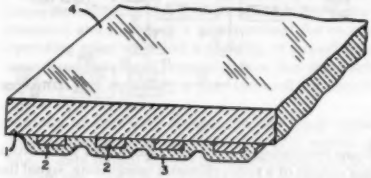


1. A transparent laminated glazing unit comprising two glass sheets, an interposed thermoplastic interlayer integral with both of said glass sheets, a transparent electroconductive heating coating and a pair of bus bars bonded to the surface of one of said glass sheets facing said interposed thermoplastic interlayer, said bus bars extending along each of a pair of opposite edges of said glass sheet, electroconductive heating means extending in localized, elongated areas adjacent to the other pair of opposite edges of said glass sheet and embedded in said interposed thermoplastic interlayer between said glass sheets in spaced relation to said coating, said space being measured in the direction of the thickness of said interlayer, electrical means including electrical terminals adapted for connection to electrical potential source means and electroconductive means to connect said transparent electroconductive heating coating and said electroconductive heating means to said electrical terminals to form electrical heating circuits, whereby, when said electrical terminals are connected to said electrical potential source means, electrical current flows through said transparent electroconductive heating coating and said electroconductive heating means to evolve heat in said transparent electroconductive heating coating and each of said electroconductive heating means.

3,974,360
ELECTRICAL HEATING UNIT INCORPORATING PROTECTIVE $PbTiO_3$ OVERGLAZE

Joseph N. Panzarino, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,799
Int. Cl.² H05B 3/16
U.S. Cl. 219—543 1 Claim

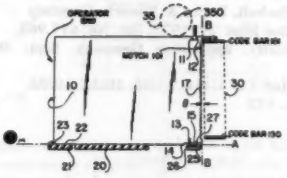


1. An electrical heating unit comprising:
a. a ceramic plate having a smooth upper heating surface and a smooth lower surface for supporting an electrical heating element;
b. an electrical heating element bonded to the lower surface of the ceramic plate, said element including a noble metal film which forms at least one continuous heating strip and consists at least predominantly of platinum;
c. a dense, non-porous lead titanate glaze bonded to the noble metal film and adjacent portions of the lower surface of the ceramic plate, said glaze consisting essentially, in weight percent on the oxide basis, of about 62–68% PbO, 12–16% TiO_2, 14–20% SiO_2 and 2–4% Al_2O_3.

3,974,361
INFORMATION STORAGE CARD WITH CODED VERTICAL EDGE

John H. Lanahan, Whitesboro, and William W. Abraham, Utica, both of N.Y., assignors to GAF Corporation, New York, N.Y.

Division of Ser. No. 420,587, Nov. 30, 1973. This application Dec. 23, 1974, Ser. No. 536,873
Int. Cl.² G06K 21/00; B07C 5/38
U.S. Cl. 235—61.12 R 1 Claim

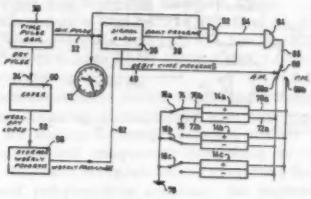


1. An information storage card having a vertical rear edge which is arranged vertically in operation in a card sorting device, a plurality of uniform notches evenly spaced along the said vertical rear edge, tabs between said notches positioned to be removed to impart information to that card and hence to distinguish that card from other similar storage cards, a notch in the top of the card having a vertically extending abutment edge adapted to be engaged to prevent forward movement of that card, and a notch in the rear lower corner of the card at the bottom of the vertical rear edge, which notch includes a downwardly facing horizontal edge extending from said vertical rear edge of the card inwardly thereof adapted to be engaged for raising the card and a rearward facing vertical edge extending upwardly from the bottom of the card adapted to be engaged for moving the card horizontally forwardly.

3,974,362
FLEXITIME RECORDER

Erich Willmann, Zell (Neckar), and Günter Trischler, Plochingen (Neckar), both of Germany, assignors to Simplex Time Recorder Company, Gardner, Mass.

Filed July 23, 1974, Ser. No. 491,068
Claims priority, application Germany, July 25, 1973, 2337712
Int. Cl.² G06M 3/14
U.S. Cl. 235—92 T 8 Claims



1. A flexitime recorder for recording overtime and undertime for a person on flexitime relative to a set working time, comprising:
timing pulse generating means for generating timing pulses;
a plurality of pulse-actuated time store counting means which are capable of incremental and decremental operation on receipt of said timing pulses, each said time store counting means being for a single said person;
display means displaying the time stored by each said time store counting means;
a pluality of switch means actuatable by said persons for controlling said time stored in respective said time store counting means in accordance with the in-time of said persons with whom the individual said time store counting means are associated; and
programming means comprising means for storing at least the earliest permitted start time, the latest permitted finish time, the said set time and any break(s), the sum of the said set time and any break(s) defining a set-time period, and means controlling said switch means whereby
when, between said earliest start time and said latest finish time, a said switch means is actuated to register in-time, the respective said time store counting means neither increases nor decreases during said set time period and increases outside said set time period,
when, between said earliest start time and said latest finish time, a said switch means is not actuated to register in-time, the respective said time store counting means decreases during said set-time period and neither increases nor decreases outside said set-time period, and
before said earliest start time and after said latest finish time and during any break(s), whether a said switch means is actuated or not, the respective said time store counting means neither increases nor decreases.

3,974,363
PROGRAMMABLE BILLING SYSTEM

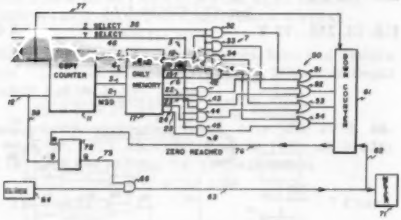
Richard M. Malinich, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 348,827, April 6, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,098
Int. Cl.² G06B 27/06
U.S. Cl. 235—925 B 16 Claims

1. A billing system for use in a copy machine comprising,
a binary copy counter for generating different binary codes in response to a series of input pulses, each pulse representing a single copy made from the same copy run,
an addressable memory programmed to generate a unique binary billing signal for each different code or group of codes from said copy counter, said billing signals operat-

ing as weighting factors representative of the relative cost of each of said copies,

means for translating said billing signals into output pulse trains, the number of output pulses in said trains being proportional to the value of said billing signals, and



counting means for counting the total number of said output pulses generated whereby said total number may be multiplied by a unit billing factor to arrive at a billing charge for the copies made.

3,974,364

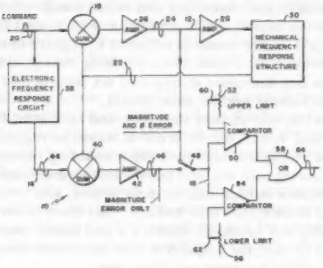
STRUCTURE FOR AND METHOD OF ERROR COMPENSATION

David W. Sallberg, Farmington Hills, and Walter E. Meyer, Royal Oak, both of Mich., assignors to Koehring Company, Milwaukee, Wis.

Filed Feb. 28, 1975, Ser. No. 554,314

Int. Cl.[2] G01M *7/00*; **G01R** *19/04*

U.S. Cl. 235—151.31 **13 Claims**



1. Error compensation structure comprising a closed loop control circuit including means for receiving a command signal, first summing means for summing the command signal and a feedback signal including both magnitude and phase error components, and mechanical frequency response structure connected to receive the command signal as an input thereto and having the feedback signal as an output therefrom in a closed loop, an electronic frequency response circuit having substantially the same frequency response as the mechanical frequency response structure connected to receive the command signal, and second summing means for summing the output of the electronic frequency response circuit and the feedback signal to provide a phase compensated error signal which has only a magnitude component.

3,974,365

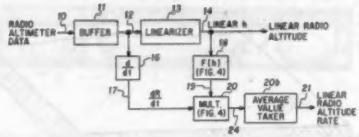
RADIO ALTIMETER RATE LINEARIZER

Lee A. Johnson, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 26, 1975, Ser. No. 617,114

Int. Cl.[2] G06G *7/28*, *7/78*

U.S. Cl. 235—151.32 **15 Claims**



1. Means processing a linearized rate output signal from the nonlinear output of a radio altimeter comprising, signal linearizing means receiving the output of said radio altimeter and providing a linearized radio altitude output signal, signal differentiating means receiving the output of said radio altimeter and providing a nonlinear radio altitude rate output signal, signal processing means receiving said linearized radio altitude signal and developing a two-level binary output signal with duty cycle proportional to said linearized radio altitude signal level between linearized radio altitude signal levels respectively indicative of defined nonlinear radio altimeter output levels corresponding to the extremes of the logarithmically varying segment of the output characteristic of said radio altimeter and including means to hold said binary level output signal at respective ones of said binary levels in response to the linearized radio altitude input levels exceeding and being less than said defined levels, signal amplifying means receiving said nonlinear radio altitude rate signal as input thereto and comprising gain changing means receiving and responsive to the output of said signal processing means to exhibit first and second discrete gain levels respectively in response to the respective binary levels of the output of said signal processing means, and the output of said signal amplifying means comprising said linearized rate output signal.

3,974,366

INTEGRATED, PROGRAMMABLE LOGIC ARRANGEMENT

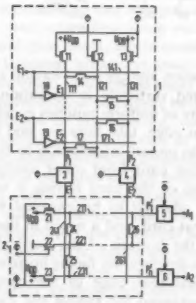
Ernst Hebenstreit, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 29, 1975, Ser. No. 617,963

Claims priority, application Germany, Sept. 30, 1974, 2446654

Int. Cl.[2] G11C *15/00*; **H03K** *19/08*

U.S. Cl. 235—152 **9 Claims**



1. An integrated programmable logic arrangement comprising:

an AND matrix and an OR matrix, each matrix including individual logic gates;

each of said AND and OR matrices including a plurality of control lines, a plurality of selector lines intersecting said control lines, a plurality of base lines, a plurality of switching transistors at selected intersections of said control lines and said selector lines, each of said switching transistors connected across an associated selector line and base line and including a gate terminal connected to the associated control line, a plurality of load transistors connected between a respective selector line and a supply potential and including a gate terminal for receiving an operating pulse train and a plurality of cut-off transistors connected between a respective base line and a reference potential and including a gate terminal for receiving an operating pulse train;

a plurality of first data storage circuits, each including a data input connected to a respective AND matrix selector line, a data output connected to a respective OR matrix control line, and a timing input for receiving an operating pulse train; and

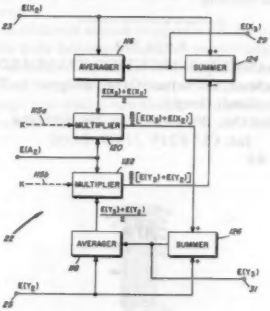
a plurality of second data storage circuits, each including a data output for the logic arrangement, a data input connected to a respective OR matrix selector line, and a timing input for receiving an operating pulse train which is anti-phase and time-synchronous with the pulse train received by said first data storage circuits.

3,974,367

SOLID-STATE RESOLVER APPARATUS

Arthur Mayer, 83-57 118th St., Kew Gardens, N.Y. 11415

Filed Nov. 4, 1975, Ser. No. 628,651
Int. Cl.² G06G 7/22
U.S. Cl. 235—189 **7 Claims**



1. A resolver for receiving an input signal having first and second components corresponding respectively to the orthogonal components X_2, Y_2 of an input vector and a third component corresponding to an angle A_2, said resolver generating an output signal having first and second components corresponding respectively to the orthogonal components X_3, Y_3 produced by rotation of said input vector through the angle A_2, comprising:

first and second averaging means, each of said first and second averaging means having a first input for receiving the first and second components of said input signal respectively, a second input and an output;

first and second multiplying means, each of said first and second multiplying means having a first input coupled to the output of said first and second averaging means respectively, a second input for receiving the third component of said input signal and an output; and

first and second summing means, each of said summing means having a first input for receiving the first and second components of said input signal respectively, a second input coupled to the outputs of said second and first multiplying means respectively and an output coupled to the second inputs of said first and second averaging means respectively, the first and second components of said output signal being generated at the outputs of said first and second summing means respectively.

3,974,368

CHEMILUMINESCENT DEVICE HAVING LONGER SHELF LIFE

Michael McKay Rauhut, Bridgewater T.W.P., N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 314,907, Dec. 13, 1972, abandoned. This application Nov. 11, 1974, Ser. No. 522,386
Int. Cl.² F21K 2/00; B65D 25/08; C09K 11/00
U.S. Cl. 240—2.25 **5 Claims**

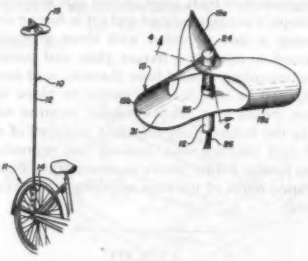
1. In a chemiluminescent device comprising a translucent polypropylene container containing at least two separated components for making a chemiluminescent mixture within said tube, one of said components comprising an oxalate diester and a fluorescer in organic solvent contacting the inner surface of said polypropylene container, the improvement wherein the inner surface of said polypropylene container is passivated by contacting said surface with a chlorosilane having at least one alkyl or aryl substituent.

3,974,369

IMPULSE OPERATING FLASHING BEACON

John F. Chmela, 1106 Beechwood Drive, Mount Prospect, Ill. 60070, and Lee M. Manna, 315 Lincolnwood, Highland Park, Ill. 60035

Filed July 22, 1974, Ser. No. 490,330
Int. Cl.² F21L 15/00; B62J 5/00
U.S. Cl. 240—6.4 R **6 Claims**



1. An impulse operating flashing beacon comprising:

a. an elongated shaft;

b. an elliptically shaped vane;

c. a source of light;

d. a bulb housing on the one end of said elongated shaft adapted to support said source of light, and a coupler formed to receive said source of light therein and to rotatably receive and support said vane;

e. said bulb housing having a reduced diameter portion terminating to form a shoulder on said bulb housing, said coupler having an axial bore in one end thereof proportioned to frictionally receive said reduced diameter portion therein to secure said coupler to said bulb housing and a stud portion on the opposite end thereof, said vane being formed of sheet material which is cut to form an odd number of radially extended vane members extending about an axially located mounting hole and a mounting hole in the opposed ends of each of said vane members, said vane being rotatably supported on said end of said shaft by extending said reduced diameter portion on said bulb housing through said axially located mounting hole, securing said coupler to said reduced diameter

portion with said vane secured between said shoulder on said bulb housing and the end of said coupler, said radially extending vane members being folded around and said stud portion being extended through said mounting holes therein, the tension on folding said vane members causing the shape to be elliptic, and means for securing the ends of said vane members in position on said stud portion.

3,974,370

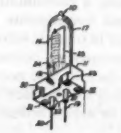
PREFOCUSED LAMP BASE AND FIXTURE

Donald L. Pearson, Moreland Hills, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 506,179, Sept. 16, 1974, abandoned. This application Apr. 10, 1975, Ser. No. 566,729

Int. Cl.² F21M *7/00;* **F21V** *21/00;* **H01R** *33/74;* **H01J** *9/18*

U.S. Cl. 240—41 BM **10 Claims**



1. A single-ended prefocused lamp comprising a sealed envelope containing concentrated energy translation means supplied by inleads hermetically sealed therein, and a base comprising a hollow body open on one side wherein an end of said envelope is accommodated and set in basing cement, said body having a side provided with three projecting bosses proportioned to contact a fixture plate and permit a stable kinematic mounting of said base thereon, said envelope end being adjusted in said basing cement to place said energy translation means in a predetermined location and attitude relative to the fixture plate engaging surfaces of said bosses whereby said location and attitude are reproducible with respect to similar fixture plates to an accuracy determined by the tolerance limits of the boss-engaging surfaces of said fixture plates.

3,974,371

ADJUSTABLE LIGHT FIXTURE

Earl F. Miles, Jr., Indianapolis, Ind., assignor to Indy Lighting, Inc., Indianapolis, Ind.

Filed June 9, 1975, Ser. No. 585,121

Int. Cl.² F21S *1/00*

U.S. Cl. 240—73 BJ **5 Claims**

1. A display lighting fixture assembly for recessed mounting in a wall or ceiling, said assembly comprising:

a. a tubular housing having a mounting flange at one of its ends adapted to mount said housing end substantially flush with a wall or ceiling surface with the body of the housing extending inwardly from said surface;

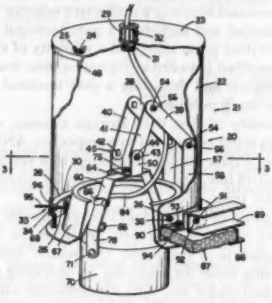
b. a beam directing reflector disposed in telescoping relation within said housing with the reflector spaced from the inner surface of the housing wall;

c. a yoke supporting said reflector for angular adjustment within said housing about an axis normal to the longitudinal axis of said tubular housing; and

d. extensible mounting means for the reflector permitting its withdrawal from within the housing, said mounting means comprising:

i. two sets of extensible toggle levers extending within said housing in spaced relation and having the corresponding lever ends pivotally supported by a first pair of bracket members, said first pair of bracket members being fixedly attached to a collar, said collar being rotatably mounted to the inside surface of said housing, said collar being rotatable through approximately 355°;

ii. a second bracket member extending between and pivotally joined to the corresponding spaced lever ends remote from said pivotally supported lever ends;



iii. a single fastening member centrally joining said reflector supporting yoke and said second bracket member thereby permitting said reflector to swivel with relation to said second bracket and said toggle levers and to be angularly tilted with relation to said supporting yoke both when said toggle levers are retracted so that said reflector is within said housing and when said toggle levers are extended so that said reflector extends outside said housing.

3,974,372

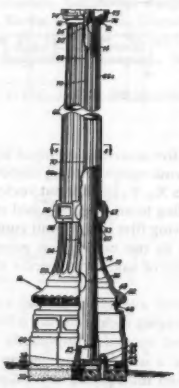
ORNAMENTAL LIGHTING STANDARD

Charles K. Cochran, Cornelius, Oreg., assignor to The City of Portland, Portland, Oreg.

Filed Oct. 30, 1974, Ser. No. 519,094

Int. Cl.² F21V *21/00, 25/00*

U.S. Cl. 240—84 **3 Claims**



1. A lighting standard comprising

a. a center pole,

b. means at the lower end of said center pole arranged to anchor it securely to a base surface in upright relation,

c. means at an upper portion of said center pole defining a support surface,

d. a separate outer ornamental shell encompassing said pole,
e. said shell comprising a tubular base member arranged to seat freely on the ground around said center pole,
f. said shell further comprising a body member portion seated freely on said base member around said center pole,
g. said base member being laterally shiftable relative to said body member while still providing support for the latter,
h. a lamp supporting bracket removably supported on said support surface of the center pole and having at least one lamp assembly thereon,
i. and hold-down means integral with the upper end of said pole holding said lamp supporting bracket down on said support surface,
j. said tubular base member being substantially larger in diameter than the portion of the center pole passing through it whereby said tubular base member can have said lateral shifting movement in the event it is struck by a vehicle to reduce the possibility of breakage of said base member.

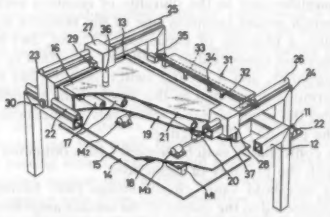
3. A lighting standard comprising
a. a center pole,
b. means at the lower end of said center pole arranged to anchor it securely to the ground in upright relation;
c. a separate outer ornamental shell encompassing said center pole,
d. said shell comprising a tubular base member arranged removably to seat on the ground,
e. said shell further comprising an elongated body member portion removably supported on said base member,
f. said elongated body member being molded of glass fiber in a plurality of arcuate segmental replaceable parts and having a snug fit on said center pole to restrict rotation,
g. a lamp supporting bracket removably supported on said center pole and having at least one lamp assembly thereon,
h. and hold-down means integral with the upper end of said center pole holding said lamp supporting bracket down,
i. said tubular base member being substantially larger in diameter than the portion of the center pole passing through it so that it can shift laterally to prevent breakage thereof in the event it is struck by a vehicle.

3,974,373
LAMP FIXTURE
Ira M. Zapolsky, 145-16 Newport Ave., Neponsit, N.Y. 11694
Filed July 21, 1975, Ser. No. 597,494
Int. Cl.² F21V *17/06*
U.S. Cl. 240—128 **9 Claims**

1. A lamp fixture for releasably holding a hollow globe, said lamp fixture comprising:
a. a housing; and
b. resilient clip means secured to a first portion of said housing in either one of at least two different locations for holding either one of at least two different sized globes in a fixed position relative to said housing, said clip means being positioned to engage a first portion of either of the globes and to urge a second portion of either of the globes into contact with a second portion of said housing, there being at least two of said clip means and said locations thereof being defined by diameters of different sizes, so that when a globe of a first size is to be held by said fixture, said clip means are positioned on one of said diameters; and when a globe of a different size is to be

held by the same fixture, said clip means are positioned on another of said diameters.

3,974,374
DEVICE FOR POSITIONING AND PUNCHING PLATEMAKING FILMS
Yoshio Inoue, No. 10, 2 chome, Tanabehigashino-cho, Higashisumiyoshi, Osaka, Osaka, Japan
Filed Apr. 7, 1975, Ser. No. 565,523
Claims priority, application Japan, Apr. 16, 1974, 49-44301
Int. Cl.² G01J *1/20*
U.S. Cl. 250—201 **1 Claim**



1. A device for positioning platemaking films or the like for use in multicolor printing, comprising a movable table for placing thereon a film to be positioned having a plurality of register marks thereon, a plurality of means for driving said movable table in both longitudinal and transverse directions, two detecting means mounted to be movable over said table and lockable at a desired position for detecting the position of the film, a photoelectric element mounted in said each detector and equally divided with cross-hairs into a plurality of light-receiving sections electrically independent of one another for transforming the amount of light incident on said each light-receiving section thereof into an electrical signal, a means for producing optical images of said register marks so as to project said optical images onto said photoelectric elements in the detectors, and a means for electrically connecting said photoelectric elements to said table driving means to drive the latter responsive to said electrical signals, whereby moving the film so that the electrical signals from said light-receiving sections of each detecting means become equal to one another.

3,974,375

DEVICE FOR MEASURING THE IRRADIATION ENERGY IMPINGED UPON A TARGET WITHIN A FIXED PERIOD

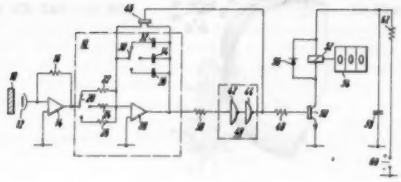
Walter Sturm, Hanau-Hohe Tanne, Germany, assignor to Original Hanau Quarzlampen GmbH, Hanau am Main, Germany

Filed Jan. 30, 1975, Ser. No. 545,667

Claims priority, application Germany, Feb. 6, 1974, 2405567

Int. Cl.[2] H01J 39/12

U.S. Cl. 250—206 4 Claims



1. A device for measuring the irradiation energy impinged upon a photo electric receiver comprising:

a. a first amplifier (14) having an input connected to an output of the photo electric receiver;

b. an integrator circuit comprising a second amplifier (28), a plurality of resistors of different values (22, 24, 26) connected in parallel to an input of said second amplifier, first switch means (20) connected to an output of the first amplifier and to the plurality of resistors such that said switch means connects one of the resistors into the circuit, a plurality of capacitors (32, 34, 36) having one terminal connected in parallel to an output of the second amplifier, and a second switch means (30) having one terminal connected to the input of the second amplifier and the other terminal selectively connectable to one of the plurality of capacitors;

c. a controllable switch element (46) connected in parallel with the plurality of capacitors;

d. a threshold value circuit means (40) having an input connected to the output of the second amplifier (28), said threshold value circuit means producing an output signal only when its input from the second amplifier reaches a predetermined level;

e. an electrically acutated visually indicating counter means (52, 54);

f. a source of electrical power (60) connected to the counter means;

g. an electrically actuated switch means (50) connected to the power source (60) in series with the counter means (54), and to the output of the threshold value circuit (40), such that upon receipt of a signal from said threshold value circuit, said switch means (50) complete the power source (60) counter means (54) circuit thereby actuating the counter means (54); and

h. means connecting the controllable switch element (46) to the output of the threshold value circuit (40) such that upon receipt of a signal from the threshold value circuit, said controllable switch element (46) closes, thereby allowing one of the plurality of capacitors (32, 34, 36) to discharge rapidly, which reduces the output of the second amplifier (28) to reset the integrator circuit to its initial conditions.

3,974,376

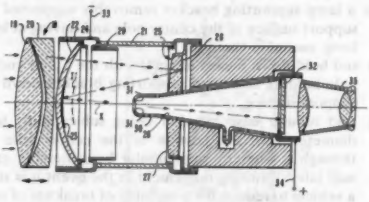
LIGHT AMPLIFIER FOR OBTAINING INTENSIFIED LIGHT IMAGE FROM PHOTOEMISSIVE SURFACE

Jan J. van der Sande, Manhasset, N.Y., assignor to Astrophysics Research Corporation, Harbor City, Calif.

Filed Nov. 22, 1966, Ser. No. 596,349

Int. Cl.[2] H01J 31/50, 39/00

U.S. Cl. 250—213 VT 11 Claims



1. In light amplification apparatus having an evacuated chamber with at least one light transmissive wall portion, a photoemissive member within the chamber, reflecting means for receiving light from an externally located object passing through the wall portion and reflecting it onto the photoemissive member, and means for focusing the photoemitted electrons from the photoemissive member and providing a visible representation of the object, the improvement comprising that said reflecting means includes a lens-mirror body, said body having a concave rear surface reflecting coating with the concavity facing generally toward the photoemissive member, and said body further having a front surface formed convexly toward the photoemissive member through which the reflected light passes.

3,974,377

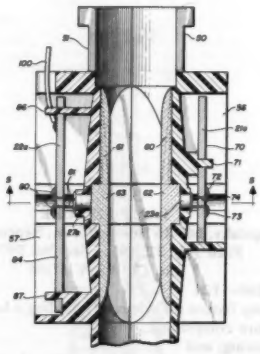
SOLID STATE SEED SENSOR

David E. Steffen, Chatham, Ill., assignor to Dickey-john Corporation, Auburn, Ill.

Continuation-in-part of Ser. No. 326,254, Jan. 24, 1973, abandoned. This application Sept. 5, 1974, Ser. No. 503,459

Int. Cl.[2] G01D 21/04

U.S. Cl. 250—222 R 17 Claims



1. A seed sensor comprising: first and second housing halves secured together to form means for supporting electronic components and providing a passage for seeds to be sensed, a light source secured in said first housing half and arranged for directing its light across said seed passage toward said second housing half, light responsive means mounted in said second housing half and arranged for receiving light from said light source, longitudinal ribs formed within the interior of each of said housing halves and adjacent said light source and said

light responsive means, said ribs extending into the seed passage a distance greater than said light source and said light responsive means to prevent impingement of seeds thereon, a component receiving compartment formed in said first housing half for receiving circuit components connected to said light source, a second component receiving compartment formed in said second housing half for receiving electronic circuit components connected to said light responsive means, and passage means formed between said first and second component receiving compartments and passing through said first and second housing halves for interconnecting the electronic components secured in said first and second component receiving compartments.

3,974,378

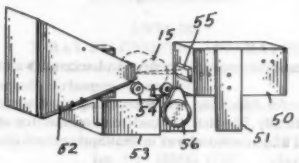
INSPECTION SYSTEM FOR REFLECTIVE AND TRANSPARENT ARTICLES

Richard D. Brugger, 4818 Walker Blvd., Erie, Pa. 16509

Continuation of Ser. No. 213,999, Dec. 30, 1971, abandoned. This application Mar. 8, 1974, Ser. No. 449,381

Int. Cl.² G01D *21/04*

U.S. Cl. 250—223 B **5 Claims**



1. A method of testing transparent articles to detect the presence of foreign substance thereon comprising,

positioning said transparent article between a light source, capable of producing a focused bar of light on said article, and the input ends of a plurality of optical fiber elements having their input ends arranged in patterns having substantially the shape of said bar of light,

focusing said bar of light onto said transparent article onto said input ends of said optical fiber elements arranged in the shape of rectangles having their major axis perpendicular to the major dimension of the bar of light for sensing light transmitted directly through said article and passing said light through said optical fiber elements, simultaneously onto a plurality of photo-sensitive elements.

3,974,379

ELECTROMECHANICAL TIMING PULSE GENERATOR

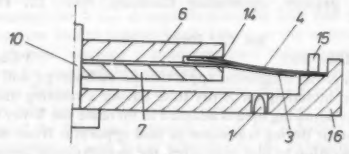
Walter Hamann, and Thomas Maurer, both of Munich, Germany, assignors to G.A.O. Gesellschaft fur Automation und Organisation m.b.H., Germany

Filed Oct. 24, 1974, Ser. No. 517,649

Claims priority, application Austria, Oct. 30, 1973, 9174/73

Int. Cl.² G01D *5/36*

U.S. Cl. 250—233 **4 Claims**



1. In an electromechanical timing pulse generator of the type in which a spaced line pattern along the circumference of a rotating transparent disc is moved past an equally spaced line pattern of a fixed disc segment, with the line patterns being scanned photoelectrically and the light-dark changes being converted into corresponding electric pulses, the improvement comprising, in combination, said rotating disc and said disc segment being formed of thin flexible plastic sheeting; means mounting said disc and said disc segment in surface-to-surface engagement in the area of said patterns, to slide on each other under a slight pressure; a light source positioned to direct light through said patterns; and a photocell in the path of light passing through said patterns to produce a timing pulse output in accordance with the rotation rotating said rotation disc.

3,974,380

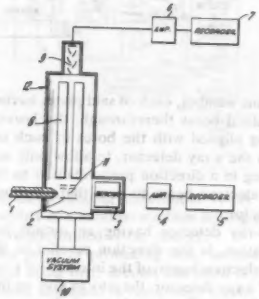
MASS SPECTROMETER

Gerhard Rettinghaus, and Rudolf Fluckiger, both of Balzers, Liechtenstein, assignors to Balzers Patent -und Beteiligungs AG, Liechtenstein

Filed Jan. 17, 1975, Ser. No. 541,955

Int. Cl.² H01J *37/08*

U.S. Cl. 250—288 **6 Claims**



1. In a gas-chromatographic detector comprising a mass-spectrometric ion separation system located in an evacuable chamber, a sample gas inlet to the chamber including nozzle means for forming a gas jet, from the sample gas delivered from a gas-chromatographic column into the chamber, an ionization device for the sample gas, and in which the gas jet formed by the nozzle passes through the ionization device without contacting the walls thereof while being ionized, means for passing ions formed by said ionization device into said separation system and a first ion responsive detector placed to receive ions from said separation system, the improvement comprising a second detector which is responsive to the ions formed of the components of the sample gas but not to the gas-chromatographic carrier gas, the arrangement being such that the sample-gas jet leaving said nozzle passes in a substantially straight line through said ionization device directly into said second detector

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3,974,381

METHOD OF ELECTRON BEAM WELDING WITH X-RAY DETECTION

Manfred Röhrle, Nellingen, and Hagen Hummel, Obersulm-Weiler, both of Germany, assignors to Mahle GmbH, Stuttgart, Germany

Filed Oct. 21, 1974, Ser. No. 516,402

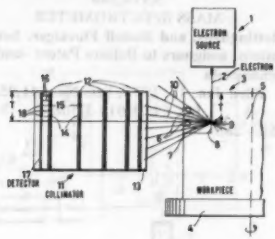
Claims priority, application Germany, Oct. 31, 1973, 2354509

Int. Cl.² G01M *23/00;* **B23K** *9/00*

U.S. Cl. 250—310 **2 Claims**

1. A method for determining the depth of a weld internal of a workpiece during electron beam welding, said method comprising the steps of:

i. supporting a workpiece in a workpiece support;
ii. directing an electron beam into said workpiece for effecting a weld within the workpiece;
iii. positioning an x-ray detector adjacent said workpiece to receive x-rays emanating solely from the weld in a plane in which said electron beam lies; and
iv. postioning a collimator between said workpiece and said x-ray detector for allowing only x-rays emanating from the weld in a direction perpendicular to the direction of said electron beam, to reach said x-ray detector;
said collimator means comprising a plurality of spaced parallel plates formed of a material having a high



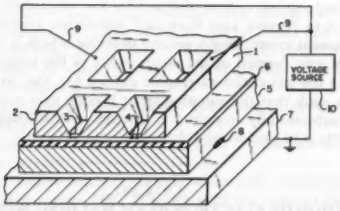
atomic number, each of said plates having a plurality of identical bores therethrough, the bores of each plate being aligned with the bores of each other plate and with the x-ray detector, to allow only said x-rays emanating in a direction perpendicular to the direction of the electron beam to pass there through to the x-ray detector,
said x-ray detector having an output indictive of the variation, in the direction parallel to the direction of the electron beam, of the intensity of x-rays received by said x-ray detector, thereby to give an indication of the depth of the weld in the workpiece.

3,974,382

LITHOGRAPHIC MASK ATTRACTION SYSTEM

Stephen E. Bernacki, Worcester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 6, 1975, Ser. No. 537,299
Int. Cl.² G03C *5/16*; G03D *13/08*; G03G *15/00*; G21K *5/00*
U.S. Cl. 250—327 **12 Claims**



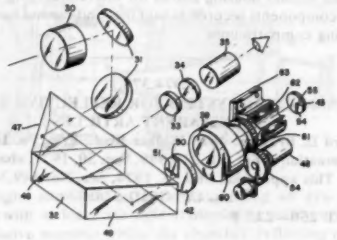
1. Apparatus for lithography comprising:
an electrically-conductive substrate,
an electrically-insulating, soft-X-ray radiation-sensitive layer on said substrate,
an electrically-conductive mask in physical contact with said layer,
a source of electrical voltage continuously connected between said mask and said substrate to pull said mask into intimate physical contact with said layer,
a source of soft-X-ray radiation to expose said layer through said mask.

3,974,383

MISSILE TRACKING AND GUIDANCE SYSTEM

Arthur S. Chapman, Rolling Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 3, 1975, Ser. No. 546,471
Int. Cl.² G01J *1/00*
U.S. Cl. 250—342 **14 Claims**



1. A optical system utilizing first and second waves, comprising:
lens means for receiving said first and second waves;
means optically coupled to said lens means for directing said first and second waves in first and second directions, respectively;
viewing means optically coupled to said wave directing means for receiving said first wave and establishing a line of sight;
rotating retrodirective reflector means having an axis of rotation being optically coupled to said wave directing means for receiving said second wave and reflecting an image in a nutating fashion over a first plane, the centroid of said nutating image deviating from the axis of rotation of said retrodirective reflector means in proportion to the angular displacement of said second wave from said line of sight of said first wave; and
rotating prism means optically coupled to said rotating retrodirective reflector means for passing a second image and causing said second image to nutate over a second plane, the centroid of said nutating image deviating from said axis of rotation in proportion to the angular displacement of said second wave from said line of sight of said first wave.

3,974,384

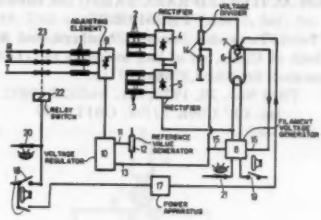
X-RAY DIAGNOSTIC APPARATUS FOR RADIOSCOPY AND X-RAY FILM EXPOSURES INCLUDING AN X-RAY TUBE HAVING A ROTATING ANODE

Hans-Werner Winkler, Buckenhof, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Oct. 22, 1974, Ser. No. 517,067
Claims priority, application Germany, Nov. 12, 1973, 2356459
Int. Cl.² H05G *1/26*
U.S. Cl. 250—401 **3 Claims**

1. In an X-ray diagnostic apparatus for radioscopy and film exposures; including an X-ray tube having a rotating anode; and power adjusting means adapted to increase the X-ray tube power output during transition of said apparatus from radioscopic operation to film exposures, the improvement comprising; exposure switch means for initiating each exposure immediately subsequently to a preceding radioscopic examination; and means for transmitting a signal representative of the actual value of the anode speed of rotation to said power adjusting means, said power adjusting means being programmed in

conformance with the permissible sequence of the X-ray tube power output and being adapted to effect the adjustment of



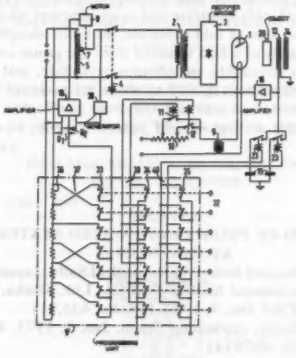
the X-ray tube power output associated with the respective anode speed of rotation.

3,974,385

X-RAY DIAGNOSTIC APPARATUS

Stig Grim, Osterskaar, Sweden, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Continuation-in-part of Ser. No. 421,485, Dec. 3, 1973, abandoned. This application June 2, 1975, Ser. No. 583,092
Claims priority, application Sweden, Dec. 6, 1972, 15891/72
Int. Cl.² H05G *1/30*
U.S. Cl. 250—402 **2 Claims**



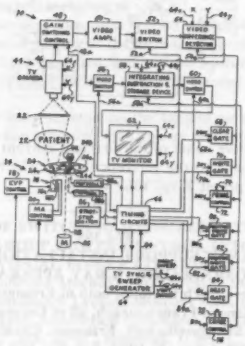
1. In an X-ray diagnostic apparatus, and X-ray tube for projecting X-rays onto a film; an automatic exposure timer for measuring the X-ray dosage received by said film from said X-ray tube and to automatically interrupt the exposure upon said dosage reaching a predetermined value; programming means for controllably varying, in dependence upon a body portion being X-rayed, the exposure parameters including X-ray tube voltage, the initial emission current and the darkening of the film; and a timing circuit for reducing the emission current of said X-ray tube during the exposure, the improvement comprising: means connected to said programming means for regulating said timing circuit pursuant to a preselected body organ or type of examination so as to reduce the emission current of said X-ray tube to a predetermined value during the exposure in dependence upon the organ being X-rayed and to thereby increase the X-ray tube voltage.

3,974,386

DIFFERENTIAL X-RAY METHOD AND APPARATUS

Charles A. Mistretta, and Frederick Keicz, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 488,250, July 12, 1974, abandoned. This application Mar. 27, 1975, Ser. No. 562,668
Int. Cl.² G03B *41/16*
U.S. Cl. 250—402 **49 Claims**



1. A method of producing differential X-ray images to improve the visibility of a contrast medium having a K absorption edge at a predetermined X-ray energy,

comprising the steps of producing first, second and third X-ray images using first, second and third X-ray spectra at first, second and third X-ray energy levels;

said first energy level being below said K edge energy;

said second energy level being above said K edge energy;

said third energy level being above said second energy level;

and subtractively combining said second X-ray image with the average of said first and third X-ray images to produce a differential X-ray image in which any image elements due to background soft tissue and bone are largely cancelled out while image elements due to said contrast medium are enhanced.

3,974,387

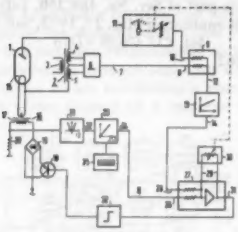
X-RAY DIAGNOSTIC APPARATUS INCLUDING MEANS FOR REGULATING THE X-RAY TUBE VOLTAGE THROUGH THE X-RAY TUBE CURRENT

Karlheinz Brönner, Erlangen; Ulrich Grassme, Nurnberg, and Eickhardt Söder, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Apr. 17, 1975, Ser. No. 569,088
Claims priority, application Germany, May 10, 1974, 2422844
Int. Cl.² H05G *1/34*
U.S. Cl. 250—409 **5 Claims**

1. In an X-ray diagnostic apparatus including an X-ray tube; a high-voltage transformer having a fixed idling output voltage; and a regulating circuit for the X-ray tube voltage, said circuit including a comparison element for comparing an actual value of the X-ray tube voltage with a reference value, and regulating means for the effective value of the filament current of the X-ray tube controlled by an output signal of said comparison element for correlating the actual value of the X-ray tube voltage to the reference value, the improvement comprising: a regulating circuit for the effective value of the filament current of said X-ray tube, said regulating circuit including an actual value transmitter and a reference value transmitter for the filament current of said X-ray tube, said

reference value transmitter being adjustable responsive to actuation of regulating circuit for the X-ray tube voltage, said regulating means being connected in said circuit and influencing the effective value of the filament current for correlating the actual value to the reference value which is determined through the preset X-ray tube voltage.



3,974,388

PATIENTS' SUPPORT INSTALLATION FOR A TOMOGRAPHIC X-RAY APPARATUS

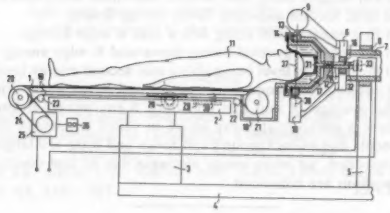
Walter Distler; Erich Kintopp, both of Erlangen, and Gerhard Linke, Erlangen-Frauenaurach, all of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Aug. 8, 1975, Ser. No. 603,114

Claims priority, application Germany, Aug. 12, 1974, 2438708

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—445 T **4 Claims**



1. In a patient's support installation for a tomographic X-ray apparatus producing tomographic X-ray images, particularly the skull of a patient as a laminagraphic object; including a base member mounting a frame; a table plate being horizontally slidably supported on said frame; a patient holding arrangement being fastened to the head-end of said table plate and adapted to encompass the laminagraphic object on all sides thereof; means for fastening said laminagraphic object in said holding arrangement in a predetermined position; X-ray generator means for generating an X-ray beam transilluminating said holding arrangement and said laminagraphic object at the elevation of the laminagraphic plane, and for scanning the laminagraphic object from different directions in the laminagraphic plane; and X-ray measuring means operatively connected with said X-ray generator means and being positioned behind said laminagraphic object in the direction of said X-ray beam, the improvement comprising: a transport web slidingly supported on said table plate for movement in the longitudinal direction thereof and forming a patient support for introduction of the laminagraphic object into said holding arrangement; an adjusting means for said laminagraphic object including drive means for effecting displacement of said table plate and of said holding arrangement on the longitudinal direction of said table plate with reference to said X-ray beam by specifiable amounts; and indicating means for determination of said displacement amounts.

3,974,389

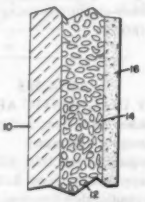
TERBIUM-ACTIVATED RARE EARTH OXYSULFIDE X-RAY PHOSPHORS

John L. Ferri, Towanda; James E. Mathers, and Ramon L. Yale, both of Ulster, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 20, 1974, Ser. No. 525,590

Int. Cl.[2] C09K *11/08*; G01T *1/00*

U.S. Cl. 250—483 **8 Claims**



4. An x-ray conversion screen comprising an x-ray transparent, light translucent substrate and in an adherent relationship to at least one side of said substrate, an x-ray phosphor consisting essentially of a host selected from the group consisting of lanthanum oxysulfide, gadolinium oxysulfide, and yttrium oxysulfide, from about 0.0005 to about 0.1 moles of terbium per mole of host as an activator and, from an effective amount to 25 parts per million of said host of cerium, as a decay accelerator.

3,974,390

METHOD OF PRODUCING EXCITED STATES OF ATOMIC NUCLEI

Masato Morita, and Reiko Morita, both of Suita, Japan, assignors to International Nuclear Fuel Co., Ltd., Osaka, Japan

Filed Jan. 9, 1974, Ser. No. 433,911

Claims priority, application Japan, Jan. 9, 1973, 48-5765; July 11, 1973, 48-78141

Int. Cl.[2] G21G *1/00*

U.S. Cl. 250—492 R **5 Claims**

1. A method of producing excited states of atomic nuclei which comprises bombarding atoms with X rays or electrons, characterized in that

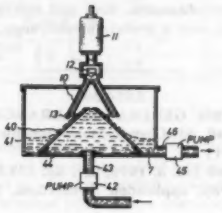
1. in the atoms selected to be produced in the excited state of their nuclei,
   a. the difference between the nuclear excitation energy and the difference between the binding energies of adequately selected two electron orbits is small enough to introduce the nuclear excitation by electron transition, and
   b. the system of the nucleus and the electrons in the case of ionizing an orbital electron in said atoms should satisfy the spin and parity conservation laws, and
2. the energy of the bombarding X rays or electrons should be larger than the binding energy of one of the said two electron orbits which is located at the shorter distance from the atomic nucleus.

3,974,391

HIGH ENERGY ELECTRON IRRADIATION OF FLOWABLE MATERIALS

Bernd Peter Offermann, Hamburg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Division of Ser. No. 419,543, Nov. 28, 1973, Pat. No. 3,891,855. This application May 16, 1975, Ser. No. 578,252
Claims priority, application Germany, Nov. 29, 1972, 2258393
Int. Cl.² H01J *37/06*
U.S. Cl. 250—492 B **2 Claims**



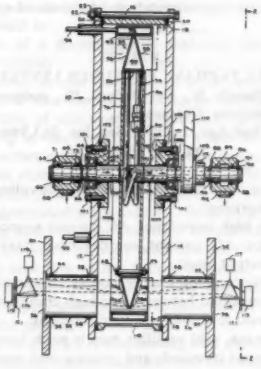
1. Apparatus for irradiating a flowable material with high energy electrons, comprising, in combination: a container for holding a quantity of such material; a hollow conical body disposed in said container, said body being open at both ends and having its smaller-diameter opening directed upwardly; means for supplying such material to the region enclosed by said body and for causing such material to move upwardly, overflow the upper end of said body, and flow down the outer wall surface of said body; and irradiation means disposed for irradiating such material with high energy electrons as the material flows down said outer wall surface of said body.

3,974,392

METHOD AND APPARATUS FOR GENERATING NEUTRONS

Lawrence Cranberg, Austin, Tex., assignor to TDN, Inc., Austin, Tex.

Filed Mar. 18, 1974, Ser. No. 452,080
Int. Cl.² G21G *3/04*
U.S. Cl. 250—499 **24 Claims**



1. An apparatus for generating neutrons comprising:

a. a toroidal target support, said support mounted for rotational movement about the axis of the toroid, said support having a first external surface thereon extending generally around the perimeter of said support, said first surface having deposited thereon a first neutron emissive target;

b. a first source of ions, said first source directing ions to said first surface as the toroidal support rotates such that ions are spread over and impinge on said first target;

c. a second external surface on said support extending generally around the perimeter of said support, said second surface having deposited thereon a second neutron emissive target, including:

a second source of ions, said second source directing ions to said second surface as the toroidal support rotates such that ions from said first and second sources are spread over and impinge on said first and second surfaces, respectively;

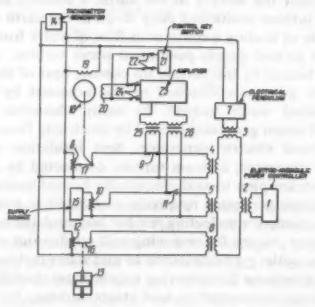
whereby the ions impinge on the targets on said first and second surfaces causing high energy neutrons to be emitted.

3,974,393

METHOD OF SWITCHING HYDRO-ELECTRIC UNIT FROM GROUP POWER CONTROL INTO THE INDIVIDUAL POWER CONTROL DUTY

Veniamin Anatolievich Marbukh, Mokhovaya ulitsa, 39, kv. 9; Veniamin Samuilovich Lychak, prospekt Metalliatov, 82, kv. 350, and Evgeny Andreevich Goncharov, Moskovsky prospekt, 174, kv. 396, all of Leningrad, U.S.S.R.

Continuation of Ser. No. 437,377, Jan. 28, 1974, which is a continuation of Ser. No. 332,098, Feb. 13, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,546
Int. Cl.² F03G *13/00*
U.S. Cl. 290—40 R **3 Claims**



1. A method of switching a hydro-electric unit from the group power control duty into the individual power control duty, said method comprising the steps of disconnecting a control system, preferentially including an electro-hydraulic controller, of the hydro-electric unit being switched into the individual control duty from the output voltage available from a common power pre-setter of all the hydro-electric units under the group power control, connecting the control system to the output voltage available from an individual power pre-setter of the hydro-electric unit being switched into the individual power control duty, comparing the output voltage of the individual power pre-setter with the output voltage of the common power pre-setter, and transferring the resulting voltage equal to the difference of the voltage being compared to shape the signal for changing the setting of the individual power pre-setter, the value of the setting required to switch the hydro-electric unit into the individual power control duty without any power push being selected so that the output

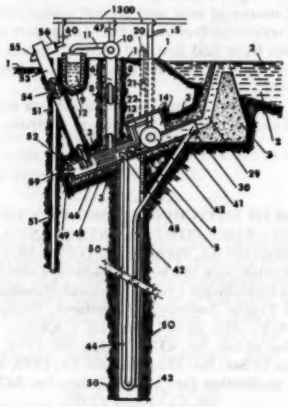
voltages under comparison of both the common and individual power pre-setters will be equal.

3,974,394

CAPTURING HYDRO POWER, EARTH POWER AND WIND POWER WITH MEANS AND METHODS OF STORING SAME

Wayne Bailey, Box 89, Johnsonville, N.Y. 12154

Filed July 10, 1974, Ser. No. 486,966
Int. Cl.² F24J *3/02*; F03D *9/02*
U.S. Cl. 290—44 7 Claims



1. In an underground hydro power plant, a source of water at or near the surface of the earth, a conduit attached to a water turbine positioned deep down in the earth said conduit capable of leading a continuous flow of water from said water source to said deeply positioned water turbine, said conduit being heated by the natural up coming heat of the earth, and electric generator attached to and actuated by said deeply positioned water turbine, as easily cleanable electrically heated steam generator heated by electricity from said deeply positioned electric generator, heat insulation around said steam generator, a steam turbine connected by a heat insulated steam pipe to said electrically heated steam generator, an electric generator rotatively connected to said steam turbine, a sump for collecting residue accumulated on said steam generator, means for removing said residue out of said sump, a water outlet pipe connected to said water turbine and to said steam generator for removing excess water therefrom, a steam condenser connected to said steam turbine, for condensing the exhaust steam issuing from said steam turbine, and a still more deeply positioned U tube receiving water from said water source and after a long travel of said received water, downward, and then upward through said U tube, said U tube positioned to receive substantial amounts of heat from the earth or other heat giving material surrounding it, and deliver warm water thus warmed to said steam boiler or steam generator, and a power line receiving electricity from one of said electric generators.

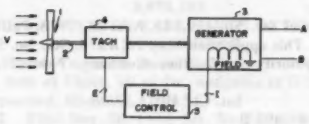
3,974,395

POWER GENERATING APPARATUS

Clark Bright, 151 Makai Place, Kula Kai, Maui, Hawaii 96790

Filed June 2, 1975, Ser. No. 582,613
Int. Cl.² H02P *9/04*
U.S. Cl. 290—44 15 Claims

1. In an apparatus having a rotatable means responsive to a moving fluid having a variable velocity for generating power, a control system comprising: means responsive to a signal proportional to the velocity of said moving fluid which approximates, with an exponential function, a function to a power for generating a control signal proportional to the



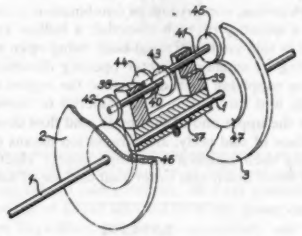
maximum power obtainable from said moving fluid by said rotatable means over a predetermined range of fluid velocities.

3,974,396

ELECTRIC GENERATOR ARRANGEMENT

Walter Schönball, 45, Chemin-Moise-Duboule, Geneva, Switzerland (1211)

Filed Jan. 8, 1975, Ser. No. 539,594
Claims priority, application Switzerland, Jan. 18, 1974, 687/74
Int. Cl.² F02N *11/04*
U.S. Cl. 290—54 11 Claims



1. An electric generator arrangement comprising at least two wheels arranged to rotate side by side on a common stationary shaft and whereof one supports a field-producing part and the other supports the armature of a generator and which are arranged to be driven in opposite directions by an external force such as wind or water force, and means for so regulating the speed of rotation of both wheels that under all operating conditions the wheels rotate in opposite directions and with at least approximately predetermined speed ratios.

3,974,397

MULTI-PHASE RECTIFIER SYSTEM

Joseph R. Killough, Jr., Des Plaines, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Apr. 1, 1975, Ser. No. 563,986
Int. Cl.² H02J *3/38*
U.S. Cl. 307—82 24 Claims

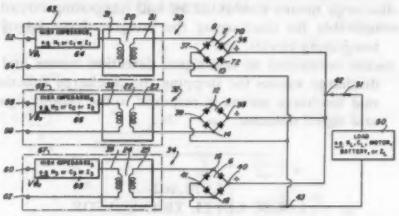
1. A multi-source rectifier system for providing DC power to a load comprising:

at least two high impedance AC current sources, said high impedance AC current sources each having first and second output lines;

high and low common load terminals for carrying power to a load connected between said high common load terminal and said low common load terminal;

rectifier means, said rectifier means each having first and second input terminals and positive and negative output terminals, one of said rectifier means connected between each of said high impedance AC current sources and said high and low common load terminals such that the said first and second output lines of each of said high imped-

ance AC current sources are connected to the first and second input terminals of one of said rectifier means aand said positive and negative output terminals of each of said rectifier means are connected respectively to said high



and low common load terminals to provide direct current to said high and low common load terminals which in turn carry power to a load connected between said high common load terminal and said low common load terminal.

3,974,398

WIRE AND STEEL TUBE AS AC CABLE

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201

Continuation-in-part of Ser. No. 107,351, Jan. 18, 1971, Pat. No. 3,777,117, which is a continuation of Ser. No. 805,718, March 10, 1969, Pat. No. 3,617,699. This application Oct. 11, 1973, Ser. No. 405,705

Int. Cl.[2] H01B *7/30, 11/02*

U.S. Cl. 307—147 **24 Claims**

1. A system for conducting AC comprising:

a. means for supply of AC having at least two terminals, a first and a second;

b. at least one elongated electrical conductor means, insulated throughout its length and having a near end and a far end;

c. at least one elongated shape, having a near end and a far end, which is:

i. made of a ferromagnetic material having electrical conductivity;

ii. adjacent to and coextensive of at least most of the length of said electrical conductor means;

iii. capable of concentrating the flow of said AC when flowing in one direction of its length in a skin having conductance adjacent to and coextensive of the length of said electrical conductor means, said skin conductance concentrating being due to the electromagnetic field generated when said AC flows in a reverse direction in said adjacent electrical conducting means;

iv. of a thickness at least twice the depth of said skin in which said flow of AC is concentrated;

d. means for electrically connecting said first terminal of said AC supply means and said near end of said electrical conductor means;

e. means for electrically connecting said second terminal of said AC supply means and said near end of said elongated shape;

f. at least one electrical load with means for electrically connecting a first terminal of said load to said far end of said electrical conductor means, and means for electrically connecting a second terminal of said load to said far end of said elongated shape;

g. an electrical circuit established:

i. from said first terminal of said AC supply means through the substantial length of said electrical conductor means; then

ii. through said electrical load; then

iii. back through said substantial part of the length of said elongated shape so as to produce a skin effect current which is concentrated near the surface of that part of said elongated shape which is adjacent to said electrical conducting means; and at least some part of the cross section of said elongated shape outside of the surface skin wherein skin effect current is concentrated becomes an effective electrical insulator; and the surface on the far side of said elongated shape from said electrical conductor means carries only a negligibly small amount of current; then finally

iv. back to said second terminal of said AC supply means to complete the electrical circuit; wherein

h. the resistance of said electrical load is large compared to the resistance of said electrical conductor plus the resistance of said elongated shape as controlled by said skin effect therein.

3,974,399

ACTIVE HIGH Q FILTER USING TRANSISTOR

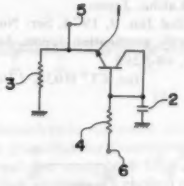
Satoshi Oyama, and Akira Takahashi, both of Omiya, Japan, assignors to Yagi Antenna Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,849

Claims priority, application Japan, May 9, 1974, 49-51665[U]; May 9, 1974, 49-51666[U]

Int. Cl.[2] H03K *17/00*

U.S. Cl. 307—233 R **10 Claims**



1. Two-terminal active impedance circuit comprising a transistor having collector and base directly connected together, said base being applied with a bias voltage, a capacitor for connecting said collector to a first terminal, a resistor for connecting said emitter to said first terminal to thereby conduct direct current component to said first terminal, and a second terminal connected to said emitter.

3,974,400

LIMITER CIRCUIT

Masashi Takeda, Isehara, and Kenzo Akagiri, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sept. 5, 1975, Ser. No. 610,862

Claims priority, application Japan, Sept. 12, 1974, 49-110056

Int. Cl.[2] H03K *5/08, 1/14;* **H03G** *3/30*

U.S. Cl. 307—237 **13 Claims**

1. A limiter circuit to pass a signal with or without amplitude limiting, selectively, said circuit comprising:

A. an input circuit section;

B. an output circuit section;

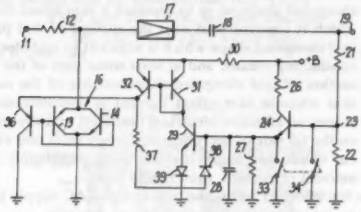
C. a controllable impedance element to control the transfer of signal voltage through said limiter circuit from said input circuit section to said output circuit section;

D. rectifier means for producing a rectified voltage having a magnitude determined by the magnitude of the signal

voltage at a circuit point in said limiter circuit between said input circuit section and said output circuit section;

E. conversion means for converting the rectified voltage to a corresponding current signal;

F. supply means for supplying said current signal to said controllable impedance element to contol the impedance



thereof and thereby control the transfer of signal voltage between said input section and said output section; and

G. a bypass circuit connected to said supply means to bypass said current signal away from said variable impedance element selectively when the amplitude of the signal voltage at said output circuit section is not to be controlled by said controllable impedance element.

3,974,401

SYSTEM FOR DETECTING THE TRANSMISSION DIRECTION OF A SIGNAL ON A TWO-WAY TRANSMISSION LINE

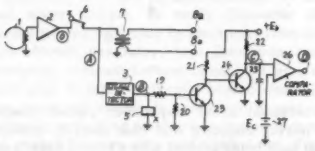
Hisashi Eguchi, Machida, Japan, assignor to Iwasaki Tsushinki Kabushiki Kaisha, Japan

Filed Jan. 9, 1974, Ser. No. 431,980

Claims priority, application Japan, Jan. 10, 1973, 48-5284; Jan. 10, 1973, 48-5285

Int. Cl.[2] H03K *17/00*

U.S. Cl. 307—241 **5 Claims**



1. A system for detecting the transmission direction of a signal on a two-way transmission line, comprising:

signal detection means responsive to said signal for developing an output signal in response thereto, said signal detection means having and input connected to the two-way transmission line for receiving said signal;

switch means for switching between an ON and an OFF state and connected to a junction between said signal detection means and the two-way transmission line and normally assuming the ON-state;

control means electrically coupled to said signal detection means and said switch means for switching said switch means from the ON-state to the OFF-state when said signal detection means develops an output signal, whereby the transmission direction of said signal on the two-way transmission line is represented by whether or not the output signal of said signal detector is developed after said switch means is in the OFF-state;

a comparator having two differential input terminals,

a first dc source connected to one of said two differential input terminals of said comparator for applying to the same a dc reference voltage

a second dc source for generating a predetermined dc voltage higher than said reference voltage,

an integrating circuit having an input connected to said second dc source and an output connected to the other of said two differential input terminals of said comparator for integrating said predetermined dc voltage,

discharge means connected to said integrating circuit and operable for discharging the integrated output of said integrating circuit, and

means connected to said signal detection means and said discharge means for stopping the discharge function of said discharge means in response to the output signal of said signal detector.

3,974,402

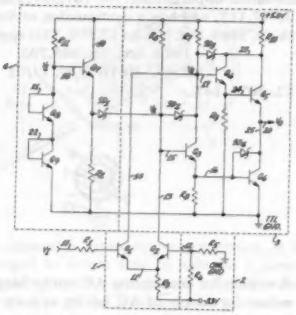
LOGIC LEVEL TRANSLATOR

Darrell L. Fett, Scottsdale; David A. Bird, Phoenix, both of Ariz., and Jerry L. Rauser, Crystal, Minn., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,329

Int. Cl.[2] H03K *1/14, 19/08*

U.S. Cl. 307—264 **4 Claims**



1. Apparatus in a logic level translator, translating signals from a first logic level to a second logic level, for reducing the effect of noise in said translator and increasing the operational speed of said translator, said apparatus comprising:

a TTL logic gate having an input lead, an output terminal transmitting signals at a second logic level, and a first ground potential;

a CML current switch having an input terminal receiving signals at a first logic level, said switch being connected to a second ground potential, said second ground potential being electrically isolated from said first ground potential, said switch comprising switching means connected to said input lead of said TTL logic gate, said switching means being responsive to a first logic level signal in a first condition for causing said TTL logic gate to transmit a second logic level signal in a first condition, and said switching means further being responsive to a first logic level signal in a second condition for causing said TTL logic gate to transmit a second logic level signal in a second condition; and

a clamp circuit connected to said current switch for limiting the current flow through said switching means to a predetermined value.

3,974,403

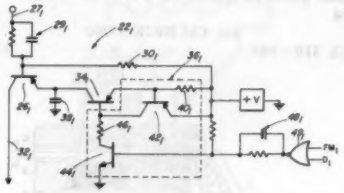
DIGITAL DATA TRANSMISSION SYSTEM

Christos J. Georgopoulos, Lowell, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 267,748, June 30, 1972, abandoned. This application Nov. 11, 1974, Ser. No. 522,384

Int. Cl.² H03K 3/53

U.S. Cl. 307—270 2 Claims



1. In a digital system, the combination comprising:

a. a transmission line;

b. a plurality of input/output devices coupled to such transmission line, each one of such plurality of devices having an output transistor coupled to a voltage supply through a first transistor; and,

c. means for inhibiting a flow of current from the voltage source, through the first transistor, to the output transistor, such inhibiting means including an electronic switch coupled to the base electrode of the first transistor of each one of the plurality of input/output devices.

3,974,404

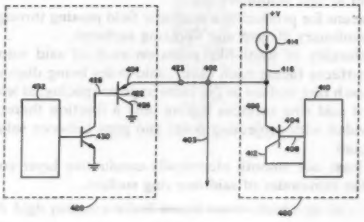
INTEGRATED CIRCUIT INTERFACE STAGE FOR HIGH NOISE ENVIRONMENT

William Folsom Davis, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 332,950, Feb. 15, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,306

Int. Cl.² H01L 27/04

U.S. Cl. 307—303 6 Claims



6. An integrated circuit device formed in a region of semiconductor of a first conductivity type comprising:

input terminal means for receiving an externally applied input signal, said input terminal means not being a power supply terminal;

a vertical transistor including a first base region, a first emitter region, and a first collector region, said first collector region being a first region of a second conductivity type in said region of semiconductor at a surface portion thereof, said first base region being a second region of said first conductivity type in said first region at said surface portion, said first emitter region being a third region of said second conductivity type in said second region at said surface portion;

lateral input transistor means in said region of semiconductor as said surface portion for preventing injection of minority carriers into said region of semiconductor in response to noise signals externally applied to said input terminal means, said lateral input transistor means having a second base region, a second emitter region, and a second collector region, said second emitter region being coupled to said input terminal means, said second base region being a fourth region of said second conductivity type in said region of semiconductor at said surface portion, said second collector region being a fifth region of said first conductivity type in said fourth region at said surface portion, said second emitter region being a sixth region of said first conductivity type in said fourth region at said surface portion spaced from said second collector region, said second collector region and said second base region being connected to a control circuit in said integrated circuit; and

constant current source means coupled to said second emitter region for supplying a substantially constant amount of current to the node at which said input terminal means and said second emitter region are connected.

3,974,405

PIEZOELECTRIC RESONATORS

Hans Schussler, Ulm (Danube), and Gerhard Kohlbacher, Ulm-Wiblingen (Danube), both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Germany

Continuation of Ser. No. 50,608, June 29, 1970. This application Mar. 12, 1973, Ser. No. 340,375

Claims priority, application Germany, June 28, 1969, 1932911

Int. Cl.² H01L 41/04

U.S. Cl. 310—9.8 3 Claims

1. In a completed piezoelectric resonator arrangement of one-piece construction prepared for connection between a signal source and a load and composed of a plate-shaped vibratory material to which coatings are applied on both sides, a pair of such coatings being applied at each of its input and output ends to define input and output transducers, and pairs of such coatings being applied between such ends to define resonators, with a signal input terminal being connected to one of the coatings of the input transducer and a signal output terminal being connected to one of the coatings of the output transducer, the improvement wherein in order to reduce the capacitive coupling between the input and output transducers, both coatings of at least one resonator are connected to ground, at least one but less than all of the remaining coatings disposed between the input and output transducers, and defining resonators, is connected to ground, and those of the remaining coatings which are not connected to ground are also electrically isolated from said input and output terminals.

3,974,406

ELECTRICAL MACHINE

Heinz Wehde, Rothenberg uber Michelstadt, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Apr. 11, 1975, Ser. No. 567,084

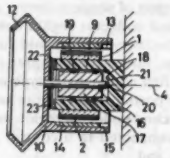
Claims priority, application Germany, Apr. 11, 1974, 2417818

Int. Cl.² H02K 7/08

U.S. Cl. 310—67 R 12 Claims

1. In an electrical machine including a rotor, a plurality of permanent magnets mounted on the rotor, a stator spaced from the rotor by an air gap, and electrical windings disposed

on the stator to be traversed by the magnetic fields of the permanent magnets, the improvement comprising a rotor bearing including means elastically holding said rotor relative to said stator, and wherein said stator comprises a stator body carrying said windings and made of an electrically nonconductive and nonmagnetizable material for preventing hysteresis losses, eddy current losses, and magnetic reaction forces on



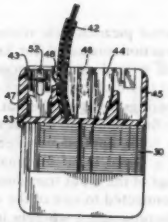
said rotor, and said permanent magnets, said windings and said stator are arranged for causing the magnetic fields of said permanent magnets to pass through the air gap between rotor and stator, said windings, and said stator body, and further wherein each said winding is composed of at least one conductor constituted by a plurality of wires which are electrically insulated from one another and which are twisted together.

3,974,407

INDUCTIVE DEVICES AND TERMINATION ARRANGEMENTS THEREOF

Richard W. Dochterman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Jan. 28, 1974, Ser. No. 437,336
Int. Cl.² H02K *11/00*
U.S. Cl. 310—71 **8 Claims**



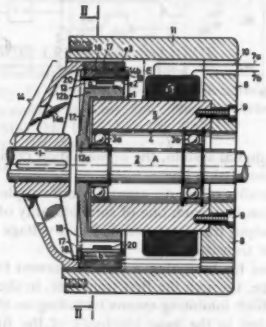
1. For use in a dynamoelectric machine: a stator comprising a wound coil and core assembly, an insulating body supported on the core assembly to form part of the stator core assembly and to provide an insulation barrier between at least part of the wound coil and at least part of the core assembly, and at least one termination arrangement; said insulating body including at least one connection receiving and retaining portion that forms a part of the at least one termination arrangement; at least one lead wire interconnected with at least one coil lead, the interconnected portions of the at least one lead wire and at least one coil lead being disposed within the at least one connection receiving and retaining portion; and at least one wedging member formed of insulating material received in the at least one termination arrangement in a wedging member accommodating means that is established by the insulating body, said at least one wedging member firmly retaining the interconnected portions of the at least one lead wire and at least one coil lead in place within the at least one connection receiving and retaining portion.

3,974,408

ASYNCHRONOUS SYNCHRONIZABLE MAGNETIC COUPLING

Henri Fehr, Montmorency, France, and Raymond Lucien Carriere, deceased, late of Paris, France (by Jeanne Constance Carriere, heiress and legal representative), assignors to Compagnie de Construction Mechanique Sulzer, Paris, France

Filed Jan. 20, 1975, Ser. No. 542,498
Claims priority, application Switzerland, Jan. 22, 1974, 798/74
Int. Cl.² H02K *49/06*
U.S. Cl. 310—103 **12 Claims**



1. An asynchronous synchronizable magnetic coupling for the transmission of a torque, comprising

means defining a stationary axially-symmetrical air gap between two smooth and parallel rotary-shaped surfaces;

a driving rotor having a magnetizable ring within said gap and including a smooth surface facing one of said parallel surfaces of said gap;

a driven rotor coaxially mounted relative to said driving rotor having a magnetizable ring within said gap and having a smooth surface facing the second of said parallel surfaces of said gap and a second surface facing said driving rotor ring surface to define a partial air-gap parallel to said stationary gap;

a means for producing a magnetic field passing through said stationary air gap and said ring surfaces;

a plurality of tooth-like poles on each of said rotor ring surfaces facing each other. said poles being disposed on each ring surface at the same angular spacing, at least one of said ring surfaces having only a fraction thereof provided with projecting poles and gaps between said poles ;and

at least one smooth electrically-conductive layer covering the remainder of said one ring surface.

3,974,409

COIL END-TURN SUPPORT STRUCTURE FOR LARGE DYNAMOELECTRIC MACHINES

Robert E. Loy, Columbus, Ohio, assignor to McGraw-Edison Company, Elgin, Ill.

Filed Jan. 30, 1975, Ser. No. 545,418
Int. Cl.² H02K *3/46*
U.S. Cl. 310—260 **8 Claims**

1. In a dynamoelectric machine having a rotor and a stator, a stator coil end-turn support assembly comprising:

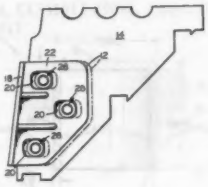
a. at least one first support member secured to the stator adjacent to the stator coil end-turns;

b. at least one second support member secured to the stator coil end-turns;

c. at least one bail bearing assembly, one of said support members having a slot therein elongated in the axial

direction of the machine and having a width in the radial direction of the machine between axially extending sidewalls, only slightly greater than the outside diameter of said ball bearing assembly;

d. a cylindrical member having first and second portions, said first portion being received in the bore of said ball bearing assembly, said other support member being provided with a bore to snugly receive said second portion of said cylindrical member, said bearing assembly engaging one of the sidewalls of said elongated slot and being free to roll in said elongated slot in the axial direction to permit axial movement of the coil end-turns, whereby said stator coil end-turns are supported with freedom to move in the axial direction only.

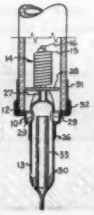


3,974,410

ALUMINA CERAMIC LAMP HAVING ENHANCED HEAT CONDUCTION TO THE AMALGAM POOL

Byron R. Collins, Twinsburg, and Charles I. McVey, Shaker Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 565,191, April 4, 1975, abandoned. This application Nov. 3, 1975, Ser. No. 628,203
Int. Cl.² H01J *61/52*
U.S. Cl. 313—42 **12 Claims**



1. A high pressure alkali metal vapor discharge lamp comprising:

a slender light-transmissive ceramic tube having closures sealed to opposite ends and electrodes supported thereby; a filling of alkali metal in excess of the quantity vaporized in operation and an inert gas within said tube;

at least one of said closures comprising a metal tube extending hermetically therethrough;

said metal tube supporting the electrode at its inner end, having an opening into the ceramic tube, and being closed at its outer end to provide a reservoir for condensed alkali metal;

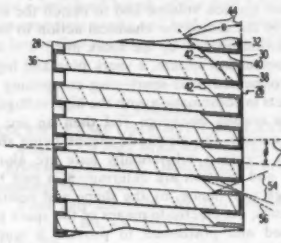
and metal of high heat conductivity enclosed within said metal tube and extending from the region of the end of the ceramic tube towards the closed end of said metal tube, said metal serving to raise the temperature of the amalgam condensed at the closed end of said metal tube.

3,974,411

CHANNEL PLATE ELECTRON MULTIPLIER TUBE HAVING REDUCED ASTIGMATISM

Richard Dale Faulkner, Lancaster, and Charles Michael Tomasetti, Turnersville, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 20, 1970, Ser. No. 78,335
Int. Cl.² H01J *43/00*
U.S. Cl. 313—105 CM **5 Claims**



1. An electron discharge tube of the type including:

an envelope having an evacuated interior space;

an electron source which emits electrons into said evacuated space, and

a channel plate electron multiplier comprising an electrically insulating plate having an input face upon which said emitted electrons are incident and an output face from which multiplied electrons emerge, said multiplier having a plurality of parallel channels extending from said input face to said output face, that portion of said channels near said output being slanted with respect to said output face, said input and output faces each having an electrically conducting layer thereon, wherein the improvement comprises that:

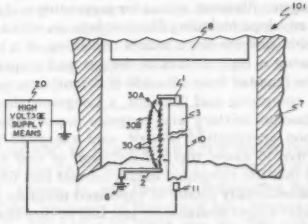
a substantially annular segment of said conductive layer on said output face extends into each of said channels, the end of each annular segment being similarly slanted with respect to said output face in the same direction as and at least to the same degree of magnitude as said channel is slanted with respect to said output face.

3,974,412

SPARK PLUG EMPLOYING BOTH CORONA DISCHARGE AND ARC DISCHARGE AND A SYSTEM EMPLOYING THE SAME

George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 3, 1975, Ser. No. 546,232
Int. Cl.² H01T *13/20*
U.S. Cl. 313—131 R **31 Claims**



12. A spark plug that comprises, in combination, electrode means to create a corona discharge and an arc discharge, the electrode means having tapered sparking surfaces, the electrode means being shaped and positioned to create a substan-

tially long arc along a path whose shape and location are determined in part by the corona discharge and, hence, by the shape and position of the electrode means, the electrode means being further shaped and positioned to provide a configuration wherein the path of the arc is determined, in part, by the electromagnetic interaction between electric current in the arc and electric current in the electrodes and, in part, by the shape, position and orientation of the electrodes so that the arc will tend to move by virtue of said electromagnetic interaction to provide a continuously changing position of the arc to increase ignition volume and to match the energy and temperature of the arc to the chemical action to be initiated in the combustion process by the spark plug.

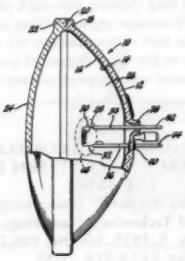
31. In a combustion system, a spark plug and high voltage means interconnected, said spark plug comprising electrode means that acts in combination with the high voltage means to create first a corona discharge and then an arc discharge through the corona, the electrode means being shaped and positioned to create a substantially long arc along a path whose shape and location are determined in part by the corona discharge and, hence, by the shape and position of the electrode means, the electrode means of the spark plug being further shaped and positioned to provide a configuration wherein electromagnetic interaction between electric current in the arc and electric current in the electrodes acts so that the arc will tend to move by virtue of said electromagnetic interaction, said high voltage means being operable to introduce to the spark plug a voltage waveform that serves to provide timing for both the corona discharge and the arc discharge.

3,974,413

INCANDESCENT LAMP WITH MODIFIED HELIUM FILL GAS

Gale M. Craig, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed May 1, 1975, Ser. No. 573,523
Int. Cl.² H01K *1/50*
U.S. Cl. 313—222 **2 Claims**



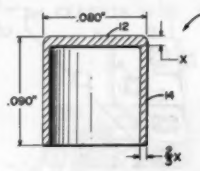
2. An incandescent lamp comprising: gas tight envelope means, a tungsten filament, means for supporting said filament within said envelope including filament legs, an initial gaseous mixture within said envelope means consisting of a nonreactive gas having a high molecular weight and a quantity of helium in the range of from 1% – 6% of the mixture, means for electrically energizing said filament, a Langmuir sheath produced of gaseous mixture and tungsten vapor around said filament upon energization thereof, said energized filament being effective to cause thermal diffusion in said envelope means such that the Langmuir sheath around said filament is composed substantially totally of vaporized tungsten and said high molecular weight nonreactive gas, said helium concentration increasing outwardly from said sheath to produce a gas mixture in said enclosure means in surrounding relationship to said sheath with a thermal flux greater than that of the original gaseous mixture to cause a greater temperature gradient within said sheath that drives tungsten vapor from said sheath for redeposition on said filament.

3,974,414

CATHODE RAY TUBE CATHODE

William E. Buescher, Seneca Falls, N.Y., and Donald R. Kerstetter, Emporium, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 9, 1975, Ser. No. 594,326
Int. Cl.² H01J *5/50*
U.S. Cl. 313—331 **4 Claims**



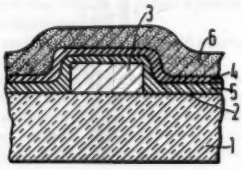
1. A die-drawn, low mass cathode cap for a multi-part cathode assembly; said cathode cap being substantially cup-shaped with a closed end and an integral upstanding side wall; said closed end having a given thickness and the entire length of said side wall having a thickness substantially less than that of said closed end.

3,974,415

LIGHT-SENSITIVE TARGET

Claus Kunze, Taunusstein, Germany, assignor to Heimann GmbH, Germany

Filed May 13, 1974, Ser. No. 469,115
Claims priority, application Germany, May 15, 1973, 2324497
Int. Cl.² H01J *31/46, 29/36, 31/68*
U.S. Cl. 313—371 **6 Claims**



1. A light-sensitive system for a color television camera tube comprising:

a transparent carrier plate for supporting the system,

color strip filters arranged in substantially parallel relation on the inside surface of said transparent carrier plate,

said strip filters having relatively sharp longitudinal edges,

a transparent intermediate layer formed over said strip filters to present relatively rounded edges at the exterior thereof,

a transparent conductive layer overlying said transparent intermediate layer,

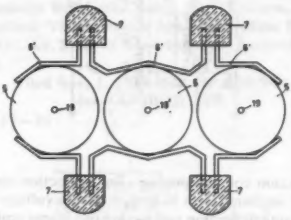
and

a light sensitive layer overlying said conductive layer, whereby sharp edges are eliminated between the conductive layer and the light sensitive layer.

3,974,416
MULTIPLE ELECTRODE SUPPORT MEMBERS WITH LOW COEFFICIENT OF EXPANSION

Antonie Sijtze van der Goot, and Peter Hermans, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,740
Claims priority, application Netherlands, Apr. 1, 1974, 7404365
Int. Cl.² H01J *29/02, 29/51, 29/82*
U.S. Cl. 313—417 **4 Claims**

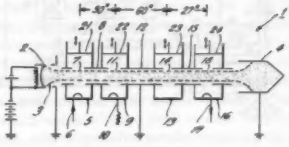


1. A color cathode ray tube comprising, in an evacuated envelope, means to generate at least two electron beams, said means comprising a number of electrodes including at least one control electrode having an aperture situated eccentrically relative to the tube axis for passing an electron beam to a convergence point, supporting members for securing said electrodes in a predetermined space relationship and having free ends secured in assembly members consisting of electrically insulating material, the eccentricity of said at least one control electrode aperture being determined by supporting means having a coefficient of linear expansion less than 80.10^{-7}/°C.

3,974,417
FOUR-CAVITY VELOCITY MODULATION TUBE

Takao Kageyama, and Hiroshi Kato, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,178
Claims priority, application Japan, Dec. 6, 1974, 49-140854
Int. Cl.² H01J *25/10*
U.S. Cl. 315—5.43 **6 Claims**



1. A velocity modulation tube of at least four cavities having a predetermined operating passband, characterized in that said tube comprises;

an electron beam source and a beam collector spaced therefrom;

an input cavity tuned to the proximity of the lower end frequency of said operating passband and positioned between said source and said collector;

one pre-intermediate cavity disposed downstream of said input cavity along the electron beam path and tuned to the proximity of the upper end frequency of said operating passband;

one post-intermediate cavity disposed downstream of said pre-intermediate cavity along the electron beam path and tuned to a fundamental resonant frequency that is higher than the upper end frequency of said operating passband but lower than a frequency which is 1.6 times as high as the center frequency of said frequency band;

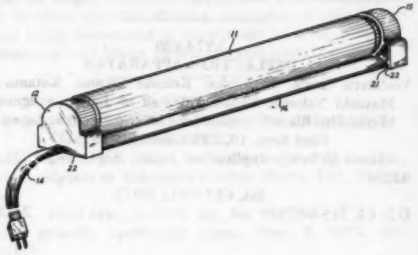
an output cavity disposed downstream of said post-intermediate cavity on the electron beam path for extracting output wave energy from a density-modulated electron beam, and a plurality of drift tubes interposed between said four cavities;

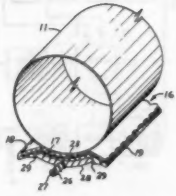
the normalized length of each one of said drift tubes being smaller than 90° in terms of the reduced plasma angle, and the normalized length of the drift tube between said pre-intermediate cavity and said post-intermediate cavity being larger than the normalized lengths of the other drift tubes.

3,974,418
FLUORESCENT LAMP UNIT WITH BALLAST RESISTOR AND COOLING MEANS THEREFOR

Elmer G. Fridrich, Cleveland, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed July 28, 1975, Ser. No. 599,523
Int. Cl.² H05B *41/16*
U.S. Cl. 315—59 **21 Claims**





1. An integral self-contained gas discharge lamp unit comprising an elongated gas discharge lamp, an elongated ballast resistor positioned adjacent to and alongside said lamp, means connecting said ballast resistor to ballast said lamp when operating, and an elongated strip heat radiator having a portion thereof extending adjacent to and alongside said ballast resistor, at least a part of the lateral dimension of said heat radiator extending away from said lamp so as to be capable of radiating heat from said ballast resistor into adjacent space.

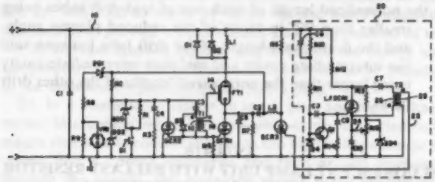
3,974,419
ELECTRONIC FLASH APPARATUS WITH INHIBITION OF CONTACT BOUNCE FALSE TRIGGERING

James R. Adams, Jr., and Dennis J. Wilwerding, both of Littleton, Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 27, 1975, Ser. No. 580,650
Int. Cl.² H05B *41/32*
U.S. Cl. 315—241 P **15 Claims**

1. In electronic flash apparatus including flash tube means for producing light; first switching means connected in series with the flash tube means, the first switching means having first and second main current carrying electrodes and a con-

trol electrode; second switching means having first and second main current carrying electrodes and a control electrode, the second switching means for triggering the flash tube means and the first switching means; the second switching means adapted to be connected to contact means for triggering the second switching means; the improvement comprising:



gating means connected in series with the contact means and the second switching means for disenabling the contact means from triggering the second switching means unless a voltage at a selected point exceeds a predetermined value.

3,974,420

DEFLECTION APPARATUS

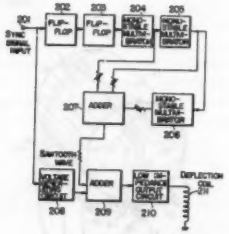
Yoshiteru Izura, Toyonaka; Keisuke Okano, Katano, and Masaaki Nakano, Shijonawate, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 10, 1973, Ser. No. 395,437

Claims priority, application Japan, Sept. 14, 1972, 47-92585

Int. Cl.² H01J *29/52*

U.S. Cl. 315—379 **3 Claims**



1. A deflection apparatus including means for receiving a standard color television signal; means for separating a synchronous signal, two kinds of chrominance signals and a luminance signal; means for recording said two kinds of chrominance signals on two divided different parts of a storage tube target; and adding means for applying said two kinds of chrominance signals to a television receiver having a deflection coil; wherein said apparatus further comprises:

means receiving said synchronous signal for frequency-dividing said synchronous signal by the factor of n, where n is an integer;

a circuit including $n-1$ cascade-connected pulse generators each generating pulses having a period which is equal to that of said synchronous signals;

means for connecting said cascade-connected circuit to an output terminal of said means for frequency-dividing and adjusting the levels of the output pulses from said pulse generators and adding them together to produce a step function wave signal;

means for generating a saw-tooth wave in synchronism with said synchronous signal; and

means for adding said saw-tooth wave signal to said step-function wave signal, the output of said adding means being coupled to said deflection coil.

3,974,421

TELEVISION DEFLECTION COIL

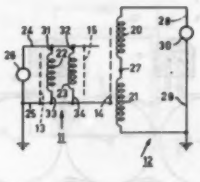
Benedictus Timotheus Johannes Holman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 6, 1974, Ser. No. 521,277

Claims priority, application Netherlands, Nov. 9, 1973, 7315351

Int. Cl.² H01J *29/70;* **H01H** *1/00*

U.S. Cl. 315—399 **5 Claims**



1. A deflection coil comprising a line deflection coil having two line coil sections, each having at least a voltage carrying lead and a frame deflection coil having two frame coil sections for the scanning of a target in a cathode ray tube by means of an electron beam, an electrical circuit element coupled to the voltage-carrying leads of the line coil sections, the circuit element including an electrically conductive foil.

3,974,422

CIRCUIT ARRANGEMENT FOR OVERLOAD PROTECTION OF A DRIVE MOTOR

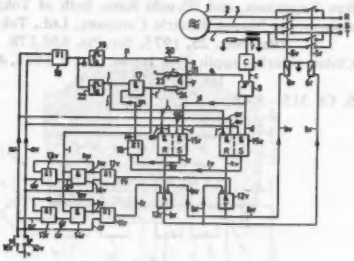
Ferdinand Konig, Seuzach, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 6, 1975, Ser. No. 547,444

Claims priority, application Switzerland, Feb. 14, 1974, 2107/74

Int. Cl.² H02H *7/08*

U.S. Cl. 317—13 A **4 Claims**



1. A circuit arrangement for overload protection of a reversible drive motor comprising

a first switching means for activating the motor to run in a first direction;

a second switching means for activating the motor to run in a second direction opposite said first direction;

a motor-load-responsive measuring means selectively connected to said first and second switching means to switch-off the motor in response to a predetermined load on the motor;

inhibitors for preventing a restart of the motor in the same direction as before a switch-off, said inhibitors being responsive to said measuring means switching-off the motor; and

cancelling means for deactivating said inhibitors in response to a start signal for running the motor in a direction

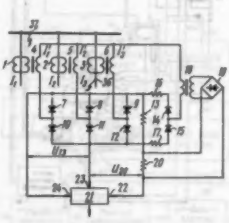
reverse to the direction occurring before a switch-off caused by said measuring means, said cancelling means including a pickoff for activating said cancelling means only in response to the lapse of a predetermined time interval for a start signal for running the motor in a direction reverse to the direction occurring befoe a switch-off caused by said measuring means.

3,974,423

DIFFERENTIAL CURRENT PROTECTIVE DEVICE

Evgeny Mefodievich Ulyanitsky, ulitsa Larina,4; Vladimir Semenovich Streltsov, ulitsa pushkinskaya, 43, kv. 1; Vladimir Ivanovich Belichenko, ulitsa Pushkinskaya, 68, kv. 89, and Vladimir Vladimirovich Mikhailov, ulitsa B.Khmelnitskogo, 151, kv. 8, all of Novocherkassk Rostovskol Oblasti, U.S.S.R.

Filed Nov. 1, 1974, Ser. No. 520,042
Int. Cl.² H02H *3/00*
U.S. Cl. 317—26 **5 Claims**



1. A differential current protective device for providing a signal when a fault such as a short-circuit occurs within a zone formed by a system which is to be protected while providing no signal when such a fault occurs outside of said zone, comprising a polyphase bridge rectifier, a plurality of current transformers connected to the system forming the zone which is to be protected, said current transformers feeding said polyphase bridge rectifier, a differential current transformer having primary and secondary windings, a single-phase bridge rectifier connected to said secondary winding of said differential transformer, each of said rectifiers having pole terminals, responsive means for providing said signal, a circuit including at least two resistors connected across said responsive means, one of said resistors being connected to said pole terminals of said single-phase bridge rectifier and the other of said resistors being connected to said pole terminals of said polyphase bridge rectifier, and means connected across said other resistor and also connected to said primary winding of said differential current transformer for providing between said resistors a voltage differential of a given minimum magnitude when a fault occurs outside of said zone and a voltage differential of a given maximum value when a fault occurs within the zone to be protected, said responsive means requiring for response a voltage greater than said minimum voltage but substantially less than said maximum voltage but a substantially less than said maximum voltage so that a signal is provided by said responsive means only when a fault occurs within the zone to be protected.

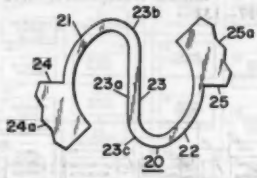
3,974,424

VARIABLE RESISTANCE BRIDGE ELEMENT

John Thomas Michael Lee, Phoenixville, Pa., assignor to ICI United States Inc., Wilmington, Del.

Filed Oct. 7, 1974, Ser. No. 512,462
Int. Cl.² F42B *3/18*
U.S. Cl. 317—80 **7 Claims**

1. A generally S-shaped bridge element for an electroexplosive device having a pair of spaced lead wires, said bridge element comprising a first arcuate portion, a second arcuate portion spaced therefrom, and a connecting portion extending from one of said arcuate portions to the other arcuate portion, said first and second arcuate portions being arcs of the same circle, said arcuate portions and said connecting portion being resistor portions, said arcuate portions being of essentially uniform width and essentially uniform resistance per unit



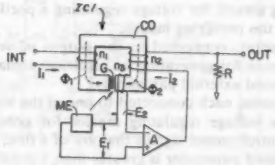
length, said bridge element being adapted to be attached to one of said leads at a point along said first arcuate portion and to the other of said leads at a point along said second arcuate portion, the length of electric current flow path through said bridge element and the effective resistance of said bridge element being determined in accordance with the points of attachment of said bridge element to said leads.

3,974,425

ISOLATOR CIRCUIT WITH IMPROVED FREQUENCY RESPONSE

Toshitsugu Ueda, and Shiro Takeuchi, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 555,193
Claims priority, application Japan, Mar. 8, 1974, 49-27450[U]
Int. Cl.² H03F *15/00*
U.S. Cl. 317—123 **10 Claims**



1. In an isolator circuit arranged to receive an input current and to produce a corresponding output current isolated therefrom, the isolator circuit being the type formed wiht a core having an input winding to which the input current is supplied and a feedback winding on which the output current is carried, a magneto-sensitive element responsive to flux in said core, and an amplifier which receives an output from the magneto-sensitive element and supplies a current to said feedback winding so as to cancel the flux produced in the core due to said input current, the improvement which comprises:

a compensation winding disposed to respond to the difference flux between the flux produced due to the input current and the flux produced due to the output current, and

means for superposing the voltage signal developed across the output of said compensation winding on the output signal of said magneto-sensitive element and for supplying the superposed signals to the input of said amplifier for development of the output current.

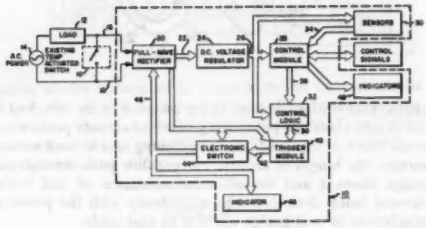
whereby the compensation winding compensates for phase lags arising in the amplifier and feedback winding, thereby extending the frequency response of the isolator circuit.

3,974,426

IN-LINE ENERGIZATION AND DE-ENERGIZATION OF AN EXTERNAL LOAD IN SERIES WITH AN EXTERNAL SOURCE OF ELECTRICITY IN RESPONSE TO EXTERNALLY SENSED PARAMETERS

Richard P. Gingras, Ridgefield, Conn.

Filed May 7, 1975, Ser. No. 575,341
Int. Cl.[2] H01H 47/26, 50/12
U.S. Cl. 317—132 19 Claims



1. A control system for controlling the energization and de-energization of a load in series with a source of alternating current electricity in response to at least two external parameters, comprising:

A. means, having input terminals connectable across the load and the alternating current electricity source series combination, for rectifying the alternating electricity at a pair of output terminals;

B. means, connected to the output terminals of the rectifying means, for voltage regulating a portion of the output of the rectifying means;

C. means, connected to the output of voltage regulating means for generating an electrical signaling response to sensed external parameters;

D. means, each connected to one of the sensing means and the voltage regulating means, for generating electrical control output signals that are of a first, ON, value if the sensed parameter is greater than a pre-determined value and is a second, OFF, value, if the sense parameter is otherwise;

E. means, connected to the output of all the control modules, for generating a control logic output signal that is of a first, ON, value if and only if all of the output signals of the control signal means are of an ON value and is a second, OFF, value if any output signal of the control signal means is of an OFF value;

F. triggering means, having an input connected to the output of the control logic signal means, for generating a trigger voltage signal if and only if the control logic means output signal is of an ON value; and

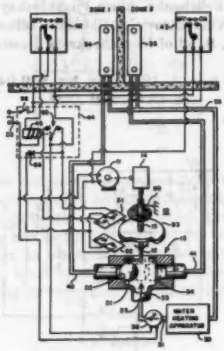
G. means, having an input connected to the trigger voltage signal of the triggering means, and connected across the output of the rectifying means, for effectively electrically connecting the input terminals of the rectifying means if a trigger voltage signal is present and for effectively disconnecting the input terminals of the rectifying means from each other if the trigger voltage signal is not present; whereby the load is energized by the alternating current electricity source if the sensed external parameters are all greater than their respective selected predetermined values, and the load is de-energized if any of the sensed external parameters are not greater than their respective predetermined values.

3,974,427

MOTOR CONTROL APPARATUS FOR THREE POSITION VALVE

Kenneth G. Carson, Newmarket, Canada, assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 7, 1974, Ser. No. 521,611
Claims priority, application Canada, Feb. 28, 1974, 193696
Int. Cl.[2] G05B 11/06; H02P 3/18
U.S. Cl. 236—1 C 7 Claims



1. A motor control apparatus comprising:

an electric motor means havng output means, said motor means having the characteristic that its output means is held by residual magnetism of said motor means after the application and then removal of a direct current power source,

an alternating current power source,

circuit means connecting said alternating current power source to said motor means to energize said motor means in one direction to drive said output means to a position between an initial position and an end position,

spring return means connected to said motor means for driving said motor means in the other direction when said motor means is not being energized by said alternating current power source,

a source of direct current power,

circuit means for connecting said source of direct current power to said motor means to magnetize said motor means to brake said motor means and hold said output means in a predetermined position intermediate said initial and said end positions when said alternating current power source driving said motor means in said one direction is removed,

and further circuit means for temporarily energizing said motor means with alternating current power to demagnetize said motor means to remove any residual magnetism when said output means is to return toward said initial position under the power of said spring return means.

3,974,428

WIDE RANGE, HIGH ACCURACY, ELECTRONICALLY PROGRAMMED SPEED CONTROL SYSTEM

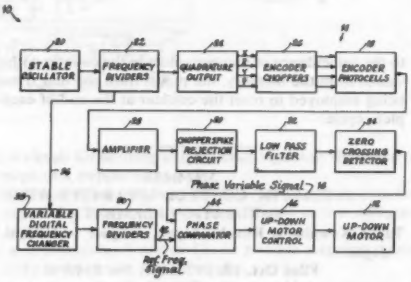
Ralph S. Hafle, Benton, Ark., assignor to Baldwin Electronics, Inc., Little Rock, Ark.

Filed May 15, 1974, Ser. No. 470,166
Int. Cl.[2] H02P 5/32
U.S. Cl. 318—314 22 Claims

1. A speed control system,

comprising a modulation signal source for producing a modulation frequency signal,

an encoder having a movable member adapted to be connected to a device whose speed is to be controlled,
means for supplying said modulation frequency signal to said encoder,
said encoder including means for converting said modulation frequency signal into a phase variable signal having a phase which is varied as a function of the position of the movable member of said encoder,
variable reference frequency control means connected to said modulation signal source for producing a variable reference frequency signal which may differ in frequency or phase from said modulation frequency signal by a selectable differential,
and means for comparing said phase variable signal with said variable reference frequency signal and for producing a speed control signal as a function of any phase



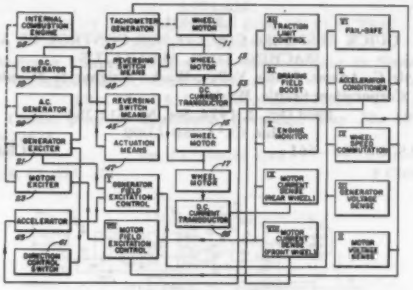
differential between said phase variable signal and said variable reference frequency signal,
said modulation signal source including a generator for producing a high frequency signal,
and frequency dividing means for dividing the frequency of said high frequency signal to produce said modulation frequency signal,
said variable reference frequency control means includes means for deriving a train of input pulses from said generator,
means for removing certain of the pulses from said train,
reinserting means for selectively reinserting certain of said removed pulses to produce a variable frequency pulse train,
and means for dividing the frequency of said variable frequency pulse train to produce said variable reference frequency signal.

3,974,429
PROPULSION CONTROL SYSTEM FOR ELECTRICALLY POWERED VEHICLES

Aaron D. Friend, and Hilmer C. Lindahl, both of Longview, Tex., assignors to R. G. LeTourneau, Inc., Longview, Tex.

Division of Ser. No. 344,080, March 23, 1973. This application May 1, 1974, Ser. No. 465,896
Int. Cl.[2] H02P *5/06*
U.S. Cl. 318—350 **5 Claims**

1. In a propulsion control system for an electrically powered vehicle wherein a plurality of direct current wheel drive motors having shunt fields connected to a common excitation source and having armatures connected in parallel and are supplied power from a suitable source and means are provided to accomplish automatic variations in motor field excitation responsive to first signals which are a function of selected vehicle operating conditions, the improvement wherein said signals comprise one or more increase functions and one or

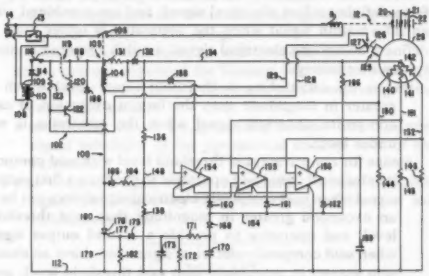


more diminish functions and means are provided to effect priority for the diminish functions.

3,974,430
MOTOR PROTECTION CIRCUIT

Hugh J. Tyler, Santa Ana, and Dennis E. Newell, El Segundo, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 6, 1974, Ser. No. 503,814
Int. Cl.[2] H02H *5/04*
U.S. Cl. 318—473 **13 Claims**



1. A protection circuit for a motor having first and second windings comprising
power input means;
a first voltage dividing circuit including first and second serially connected resistances;
a second voltage dividing circuit including third and fourth serially connected resistances;
a third voltage dividing circuit including fifth and sixth serially connected resistances;
said first, second and third voltage dividing circuits being connected in parallel across the power input means;
said third and fifth resistances being temperature responsive resistances capable of sensing temperature conditions in the first and second windings, respectively;
first voltage responsive semiconductor means having inputs connected between the junction of the first and second resistances and the junction of the third and fourth resistances;
second voltage responsive semiconductor means having inputs connected between the junction of the first and second resistances and the junction of the fifth and sixth resistances;
switch means for controlling motor energization; and
logic means, responsive to the outputs of the first and second voltage responsive semiconductor means indicating a voltage corresponding to an excessive temperature in

any of the first and second windings of the motor, for operating the switch means.

3,974,431

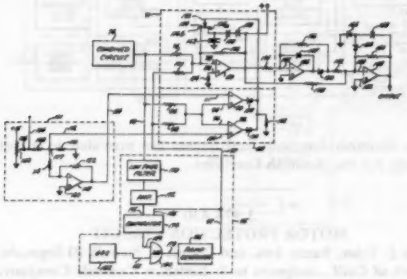
QUICK RESPONSE CIRCUIT FOR CONTROL OF A MACHINE TOOL APPARATUS

Lyle C. Adams, Maple Valley, Wash., assignor to Macotech Corporation, Seattle, Wash.

Filed Oct. 2, 1974, Ser. No. 511,284

Int. Cl.² G05B *13/00*

U.S. Cl. 318—561 **16 Claims**



1. In an automatically controlled machine tool apparatus using means for compensating for apparatus runout errors, wherein said runout errors are represented in electrical signal form defining a first electrical signal, and are combined with an information signal when the apparatus is under load to define a composite electrical signal, a quick response control system comprising:

means for establishing a threshold signal level which is greater in magnitude than the largest excursion of said composite electrical signal when the apparatus is not under load;

means for comparing said threshold level with said composite electrical signal and operative to produce a first output signal when said composite electrical signal does not have an excursion greater in magnitude than said threshold level, and operative to provide a second output signal when said composite electrical signal does have an excursion greater in magnitude than said threshold level; and,

means operative to enable said compensating means in response to said first signal and to disable said compensating means in response to said second signal.

3,974,432

CONTROL SYSTEM FOR REPETITIVE PROCESSES

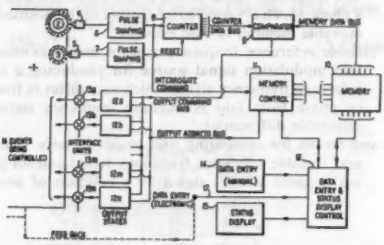
Lionel Raymond Frank Thompson, Hatfield, England, assignor to Hawker Siddeley Dynamics Engineering Limited, England

Continuation-in-part of Ser. No. 373,362, June 25, 1973. This application Jan. 23, 1975, Ser. No. 543,650

Int. Cl.² G05B *11/32*

U.S. Cl. 318—562 **9 Claims**

1. A process control system for controlling a repetitive process in which a plurality of machine events that are not interdependent in the first order take place during different phases of a total machine cycle of operation, comprising two transducers each responsive to a rotating machine member to generate electrical pulses, the first transducer generating a single reference pulse for each complete machine cycle and the second transducer generating a large number of marker pulses at short intervals between consecutive reference pulses, a counter driven by the marker pulse output of the second transducer, a memory to store the count numbers at which specific machine events are to occur, interrogation means interrogating the whole memory upon the occurrence of each marker pulse, comparator means comparing the memory output when so interrogated with the instantaneous count value in the counter, and a series of output stages arranged to deliver output signals for initiating machine events according



to the coincidence of number values in the counter with stored values from the memory, the pulses from the first transducer being employed to reset the counter at the end of each complete cycle.

3,974,433

AUTOMATIC CONTROL APPARATUS WITH SATURATION ELEMENT

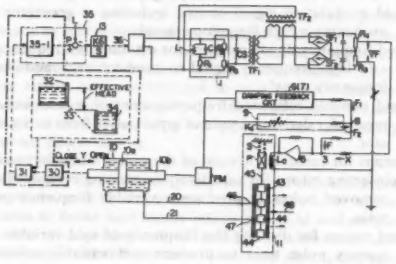
Takao Kuwabara, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 15, 1974, Ser. No. 514,993

Claims priority, application Japan, Oct. 17, 1973, 48-115931

Int. Cl.² G05B *5/01*

U.S. Cl. 318—635 **6 Claims**

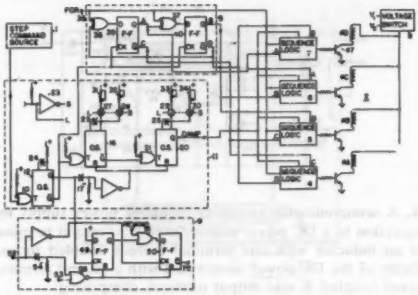


1. Automatic control apparatus provided with element having saturation characteristics, comprising a detector means for detecting deviation of an actual value from a target value, an amplifier means for receiving the output signal from said detector means at the input thereof to amplify said signal with integration to thereby produce a corresponding output signal, a feedback means for feeding back said output signal from said amplifier means through a damping feedback element and a rigid feedback element, a summing means for deriving the difference between the output signal of said detector means and said feedback means to feed the difference signal to said amplifier means, a control means to regulate a unit to be controlled in dependence upon said output signal of said amplifier means, and means for saturating the output signal of said damping feedback means only for the operation of said unit in either the opening or closing direction.

3,974,434
STEPPING MOTOR SIGNAL CIRCUIT

Robert E. Yablonski, Orange, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Division of Ser. No. 449,575, March 8, 1974. This application Jan. 10, 1975, Ser. No. 540,290
Int. Cl.[2] G05B *19/40*
U.S. Cl. 318—696 5 Claims

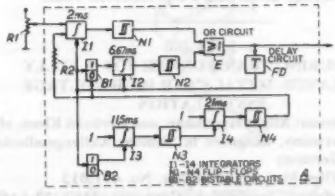


1. A circuit for deriving a signal unambiguously definitive of the steps of a stepper motor (2),
which motor has means to produce an electrical sprocket signal that is related to the steps of said motor, comprising;
a. a step command source (1) to provide stepping pulses (14) to drive said stepper motor,
b. means to electrically differentiate said sprocket signal (54), and
c. an electronic latch circuit (49,50) having relaxation elements constituted to pass only the first impulse (62) of said sprocket signal,
whereby a spurious repeat signal associated with a given step is not passed.

3,974,435
MEANS FOR SUPPLYING A LOAD OBJECT

Sten Elvin, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Dec. 24, 1974, Ser. No. 536,229
Claims priority, application Sweden, Jan. 24, 1974, 7400892
Int. Cl.[2] H02P *13/32*
U.S. Cl. 321—9 A 8 Claims

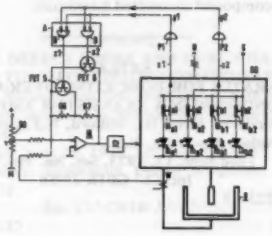


5. A method for supplying a load object (M) with direct voltage pulses with a variable frequency from a direct voltage source through a pulse generating member, which member is switchable between pulsing in groups and symmetrical pulsing, and in the case of pulsing in groups delivers pulses in groups of two pulses with a constant time interval T_1 between the two pulses of a group, said method comprising the step of switching from pulsing in groups to symmetric pulsing when, in the case of pulsing in groups, the group frequency exceeds a value $(K/2T_1)$ where $0.6 < K < 0.9$.

3,974,436
CIRCUIT ARRANGEMENT FOR AN ELECTRIC MELTING FURNACE

Wolfgang Timpe, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 15, 1975, Ser. No. 577,851
Claims priority, application Germany, May 22, 1974, 2424825
Int. Cl.[2] H02M *1/18*
U.S. Cl. 321—13 5 Claims

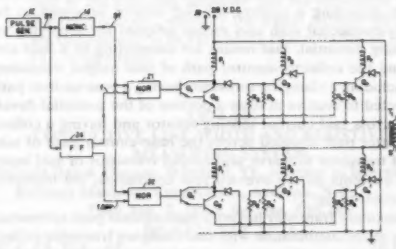


1. A circuit arrangement for use with an electric melting furnace comprising:
a controlled converter for supplying said furnace, said converter including a number of thyristors;
a control apparatus for controlling the signal being supplied by said converter including:
a control unit connected to said converter;
and a current regulator for feeding said control unit, said regulator comprising a feedback path comprising ohmic resistance means;
a monitoring circuit for generating at least one indicating signal indicative of the operational state of each of said thyristors;
and control switch means responsive to said indicating signal for selectively short-circuiting portions of said resistance means.

3,974,437
SWITCHING CIRCUIT FOR STATIC INVERTER

Bahechar S. Patel, Kettering, and Thomas W. Moore, Dayton, both of Ohio, assignors to AMF Incorporated, White Plains, N.Y.

Filed July 25, 1975, Ser. No. 598,943
Int. Cl.[2] H02M *7/00*
U.S. Cl. 321—27 R 10 Claims



1. A switching circuit for use in a static inverter for switching a d.c. voltage source to produce an a.c. output voltage, comprising

at least one switching transistor connected across said d.c. voltage source, said transistor having a control electrode and first and second electrodes,

a first transformer primary winding series connected with said switching transistor across said source,

a plurality of like conductivity type transistors compound connected in a Darlington configuration to provide a control terminal, a collector terminal, and an emitter terminal,

means for connecting the emitter terminal of the compound connected transistors to the control electrode of said switching transistor,

a second transformer primary winding series connected with said Darlington configuration, and

means for coupling input signals to the control terminal of said compound connected transistors.

3,974,438

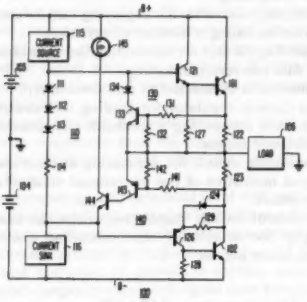
APPARATUS FOR INDICATING OVER-CURRENT CONDITION IN A TRANSISTOR AMPLIFIER

Joseph Ferrierea Alves, III, Milford, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 13, 1973, Ser. No. 396,790

Int. Cl.² G01R 19/16

U.S. Cl. 323—9 **5 Claims**



1. In an amplifier including an output transistor with a collector-emitter path and a base-emitter path; including means for supplying an operating potential; including means for supplying input signal currents to said output transistor base-emitter path; including means for connecting to a load circuit; including a current sensing resistor arranged to be serially connected with said means adapted for supplying an operating potential, said means for connecting to a load circuit and the collector-emitter path of said output transistor; and including a clamping transistor having a base-emitter path connected to receive at least a portion of the potential developed across said current sensing resistor and having a collector-emitter path coupled across the base-emitter path of said output transistor to starve said output transistor of said input signal currents during over-current conditions, the improvement comprising:

an auxiliary transistor having a base-emitter path connected in series combination with said clamping transistor collector-emitter path across said output transistor base-emitter path and having a collector electrode; and

an indicator means having an input circuit coupling said auxiliary transistor collector electrode to said means adapted for supplying an operating potential.

3,974,439

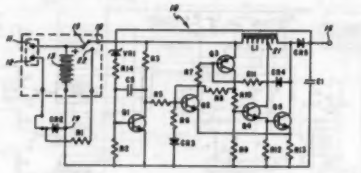
WIDE DYNAMIC CURRENT RANGE SWITCHING REGULATOR

Varnum Smith Holland, Lewisville, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 5, 1975, Ser. No. 555,510

Int. Cl.² G05F 1/60

U.S. Cl. 323—17 **13 Claims**



1. A semiconductor switching regulator power supply for connection to a DC power source, having an output terminal and an inductor with one terminal thereof coupled to one polarity of the DC power source and with a second terminal thereof coupled to said output terminal, comprising:

a. power switch means coupled to the second terminal of said inductor;

b. a trigger circuit including at least one semiconductor device having a junction forward voltage drop of n volts, said trigger circuit being coupled to said power switch means, toggling said power switch means to a conducting state when said at least one semiconductor device is in a conducting state and to a non-conducting state when said at least one semiconductor device is in a non-conducting state;

c. current sensing means coupled to said trigger circuit, to said power switch means, and to the other polarity of said DC power source for providing a current path through said inductor and said power switch means to the other polarity of said DC power source, said current sensing means biasing said at least one semiconductor device into a non-conducting state when the voltage drop across said current sensing means exceeds a predetermined value, said predetermined value being on the order of n volts or less;

d. voltage charging means coupled to the second terminal of said inductor for receiving current from said inductor when said power switch means is in said non-conducting state and for providing an output voltage to said output terminal; and

e. output voltage feedback means coupled to said output terminal and said trigger circuit and responsive to said output voltage for temporarily biasing said at least one semiconductor device into a conducting state when said output voltage drops below a preselected value.

3,974,440

MEASURING TRANSFORMER FOR A FULLY INSULATED, METAL-CLAD HIGH-VOLTAGE INSTALLATION

Heinz Schiemann; Albert Herrmann, and Gerhard Kleen, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed May 17, 1974, Ser. No. 471,013

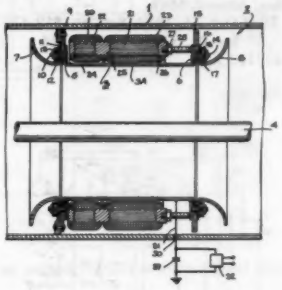
Claims priority, application Germany, May 17, 1973, 2325444

Int. Cl.² H01F 27/00; H01B 9/06

U.S. Cl. 323—44 R **17 Claims**

1. A measuring transformer for a fully-insulated, metal-clad, high-voltage installation equipped with a metal outer tube containing a high-voltage conductor comprising: a tube member arranged within and spaced from the metal outer tube of the high-voltage installation and in surrounding relation to the

high-voltage conductor, said tube member constituting a surface-type electrode and, said tube member and the high-voltage conductor conjointly defining a high-voltage capacitor; a low-voltage capacitor connected to said high-voltage capacitor so as to conjointly define therewith a capacitive voltage divider; a transformer core unit including an iron core, and a secondary winding system mounted on said iron core, said transformer core unit being arranged on the outer surface of



said tube member whereby said tube member carries said transformer core unit inside the metal outer tube of the high-voltage installation; first mounting means at one location of said tube member for attaching the same to the metal outer tube so as to be insulated therefrom; and, second mounting means at another location of said tube member for supporting said tube member with respect to the metal outer tube so as to be insulated therefrom.

3,974,441

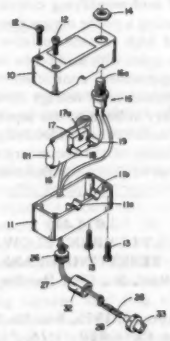
BATTERY CHECKER

Johannes Van Den Haak, Indianapolis, Ind., assignor to Curtis Dyna Products, Corporation, Westfield, Ind.

Filed June 25, 1975, Ser. No. 590,097

Int. Cl.² G01N 27/42

U.S. Cl. 324—29.5 **5 Claims**



1. A device for checking the energy level of a battery comprising manually operated switching means, a series connected light emitting diode and a silicon controlled rectifier placed across said battery terminals by said switching means, circuit means for applying a predetermined increment of the battery voltage to the control gate of said rectifier, a series connected first diode and a further light emitting diode also placed across said battery terminals by said switching means, and a second diode connected between the junction of said first mentioned diode with said further light emitting diode and the junction of said first mentioned light emitting diode with said silicon controlled rectifier, whereby if said predetermined increment of battery voltage is of sufficient magnitude said silicon controlled rectifier will go to the on condition forwarding biasing said first mentioned light emitting diode, the current flow through said first and second diodes maintaining the voltage across said further light emitting diode below the forwardly biasing level, and if said predetermined voltage increment is insufficient to produce the on condition in said silicon controlled rectifier said further light emitting diode will be forwardly biased, with the voltage drop across said further light emitting diode providing a reverse bias on said second diode to thus provide a go, no-go visual indication at said light emitting diodes of the voltage level of the battery.

3,974,442

SURFACE DEFECT PROBE AND DUAL CHANNEL APPARATUS WITH LIFTOFF COMPENSATION

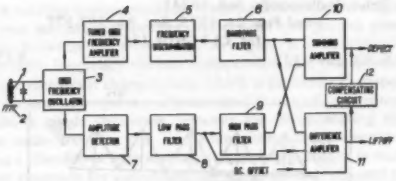
David Harvey Savidge, and Eric Wadsworth, both of Rotherham, England, assignors to British Steel Corporation, London, England

Filed June 25, 1975, Ser. No. 590,194

Claims priority, application United Kingdom, June 27, 1974, 28597/74

Int. Cl.² G01R 33/12

U.S. Cl. 324—37 **10 Claims**



1. Apparatus for detecting surface defects in an elongate metallic member, comprising

a high frequency energised eddy current probe for scanning over the surface of the member,

a dual-channel receiver responsive to signals from this probe dependent on (a) any surface defects and (b) the probe-surface spacing in a manner such that in one channel a predominant factor in the signal waveform is characteristic of (a) whilst in the other channel a predominant factor in the signal is characteristic of (b),

a summing amplifier,

a difference amplifier and

circuit means for combining the signals from the two channels in the summing amplifier and the difference amplifier, respectively, whereby the signal outputs therefrom are conditioned to be exclusively characteristic of (a) and (b), respectively.

3,974,443

CONDUCTIVE LINE WIDTH AND RESISTIVITY MEASURING SYSTEM

Donald Ralph Thomas, Westford, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 2, 1975, Ser. No. 538,288

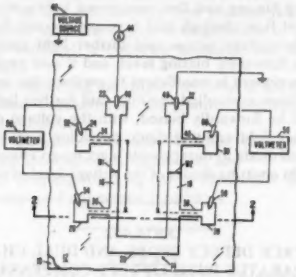
Int. Cl.² G01R 27/14

U.S. Cl. 324—64 **10 Claims**

1. A measuring system comprising

a first conductive line having a known first nominal width, a second conductive line having a known second nominal width, means for passing current of equal value through each of said lines, and means for measuring the voltage

between two points on each of said lines spaced apart by equal distances to determine in relationship with said first



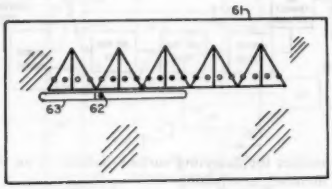
and second nominal widths characteristics of said conductive lines.

3,974,444

COMBINED DISPLAY AND RANGE SELECTOR FOR USE WITH DIGITAL INSTRUMENTS EMPLOYING THE BINARY NUMBERING SYSTEM

Ronald O. Whitaker, c/o Rowco Engineering Co., 4719 Squire Drive, Indianapolis, Ind. 46241

Filed Feb. 24, 1975, Ser. No. 552,177
Int. Cl.[2] G01R *15/08*
U.S. Cl. 324—115 5 Claims



1. In a measuring instrument having a plurality of input ranges and providing as intermediate output a set of signals forming a binary numbering system representation of the magnitude of the measurand;

in combinaton, a digital display and range selector comprising a slide, a faceplate, and a switch;

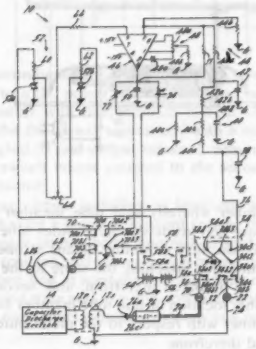
said slide bearing a plurality of indicators placed in line and equally spaced, each of said indicators taken in order being operatively associated with a respective signal of the set of intermediate signals taken in order, each of said indicators being adapted for assuming a first visible condition when said respective signal is a zero and for assuming a second and different visible condition when said respective signal is a one, said slide and said faceplate having associated therewith means for causing said slide to move in a path behind said faceplate, said path being parallel to said line of indicators; said faceplate being operatively associated with said slide and adapted for exposing said indicators to view, said faceplate bearing indicia juxtaposed the path of said indicators, said indicia being spaced at intervals equal to the intervals between said indicators, each indicium of said indicia signifying a numerical weight to be associated with any indicator occupying a position opposed said indicium, said numerical weights associated with said indicia taken in order forming a geometric progression having a common ratio of 2, the sum of said weights associated with indicia opposed by indicators in said slide for any particular position of said slide indicating the scale of said display; and said switch being operatively associated with said slide and adapted for selecting for the measuring instrument an input range corresponding to said scale.

3,974,445

PORTABLE KILOVOLTMETER

Thomas J. Crouch, Leonard, and Larry G. Hait, Roseville, both of Mich., assignors to Merc-O-Tronic Instruments Corporation, Almont, Mich.

Filed Oct. 31, 1974, Ser. No. 519,426
Int. Cl.[2] G01R *1/30, 15/04*
U.S. Cl. 324—123 R 10 Claims



1. Means for measuring the voltage output of an ignition coil having a primary winding and a secondary winding comprising: amplifying circuit means having an input and an output; input circuit means connectable between the secondary winding and the input of said amplifying circuit means; and output circuit means including an indicating means connected with the output of said amplifying circuit means; said input circuit means including a probe means comprising a capacitor means, a length of high tension resistive radio suppression cable connected in series with said probe means, an additional capacitor means operatively connected with said first-mentioned capacitor means in a voltage dividing circuit which divides the secondary voltage to the input of said amplifying circuit means, and switch means selectively operable to supply only a selected polarity of the secondary voltage of the ignition coil to the input of said amplifier means.

3,974,446

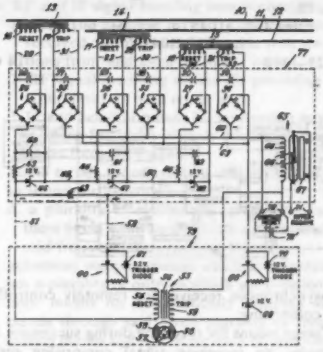
POLYPHASE FAULT CURRENT FLOW DETECTING AND RESETTING MEANS

Edmund O. Schweitzer, Jr., 1002 Dundee Road, Northbrook, Ill. 60062

Filed Apr. 10, 1975, Ser. No. 566,994
Int. Cl.[2] G01R *19/16, 31/02*
U.S. Cl. 324—133 7 Claims

1. Means for detecting flow of fault current in any phase conductor of a polyphase alternating current transmission system in which normal current flow is substantially less than said fault current flow comprising: a fault responsive device including a magnetic circuit, a trip winding on said magnetic circuit, trip current transformer means and trip rectifier means interconnecting each phase conductor and said trip winding for energizing it with direct current according to the magnitude of the flow of fault current in any of said phase conductors, a reset winding on said magnetic circuit, and reset current transformer and reset rectifier means interconnecting

each phase conductor and said reset winding for energizing it with direct current according to the magnitude of the simultaneous flow of normal current in each of said phase conductors.



3,974,447

PILOT RECEIVER

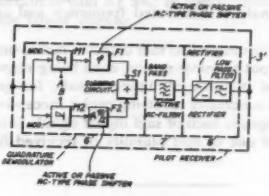
Bengt Gustav Löfmark, Skarholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Jan. 24, 1974, Ser. No. 436,091

Claims priority, application Sweden, Jan. 31, 1973, 7313161

Int. Cl.² H04J 1/02

U.S. Cl. 325—1 **6 Claims**



1. In an intermediate repeater of a carrier frequency system handling a traffic group-and-associated pilot signals, apparatus for controlling the level of signals passing through the repeater comprising:

a voltage controlled amplifier having a signal input for receiving the traffic group-and-associated pilot signals, a control signal input for receiving a control voltage whose amplitude controls the gain of the voltage controlled amplifier and a signal output; a branch circuit having a signal input connected to the signal output of said voltage controlled amplifier and first and second signal outputs for transmitting signals, said first signal output being adapted to further transfer the traffic group-and-associated pilot signals; a demodulator of the phase shift type for both frequency translating the pilot signal and for suppressing an unwanted sideband, said demodulator having an input connected to said second signal output of said branch circuit and having an output; an active RC-filter of the bandpass type connected to the output of said demodulator and having an output for passing only signals having a frequency equal to that of a translated pilot signal; a rectifier having an input connected to the output of said active RC-filter and having an output for delivering a direct voltage related to the received pilot signal amplitude, and coupling means for coupling the direct voltage to the control signal input of said voltage controlled amplifier.

3,974,448

USE OF EQUALIZERS IN SATELLITE COMMUNICATION TRANSMISSION SYSTEMS

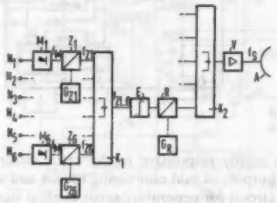
Heinz Baum, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 20, 1975, Ser. No. 542,573

Claims priority, application Germany, Jan. 21, 1974, 2402692

Int. Cl.² H04B 7/14

U.S. Cl. 325—1 **2 Claims**



1. A satellite communications transmission system having at least one satellite transponder and at least two ground radio stations between which multi-channel signals is to be transmitted at radio frequency via said transponder, said transponder having a distortion characteristic which is generally U-shaped as a function of frequency, a transmitter at one of said ground statons, a single distortion remover for compensating the entire radio frequency in said transmitter, said transmitter having a plurality of individual signals channels, means in each of said channels for converting the signal in each channel to an intermediate frequency, means combining said converted signals to a common intermediate frequency band, said distortion remover receiving the output of said combined converted common intermediate frequency band and predistorting it with a characteristic having an inverted U-shape which is opposite to the distortion characteristic of said transponder, means for converting the output of said distortion remover to a radio frequency signal and radiating it to said transponder, and means at said other ground station for receiving said radio frequency signal from said transponder and demodulating the individual signals from said radio frequency signal.

3,974,449

JOINT DECISION FEEDBACK EQUALIZATION AND CARRIER RECOVERY ADAPTATION IN DATA TRANSMISSION SYSTEMS

David Duncan Falconer, Red Bank, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 21, 1975, Ser. No. 560,576

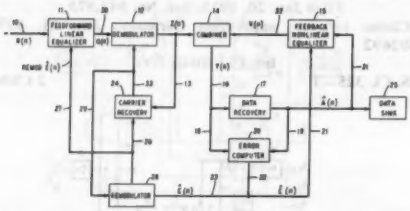
Int. Cl.² H04B 1/16

U.S. Cl. 325—321 **5 Claims**

1. In a data receiver for data signals subject to intersymbol interference and synchronously modulated onto quadrature phases of a carrier wave including a feedforward transversal equalizer for operating on each of the quadrature-related received signals, a demodulator responsive to a demodulating carrier wave for operating on each of the quadrature-phase received-signal components in the output of the feedforward equalizer, a source of the demodulating carrier wave for such demodulator a data recovery circuit for deriving quantized baseband output signals from equalized signals and a data sink for utilizing baseband output signals the improvement comprising

a feedback equalizer operating on quantized baseband signals from said data recovery circuit,

means for combining the demodulated output of said feedforward equalizer with the output of said feedback equalizer to form an equalized output signal, and



means jointly responsive to the error differences between the outputs of said combining means and said data recovery circuit for generating error control signals for each of said feedforward and feedback equalizers and said demodulating carrier-wave source.

3,974,450

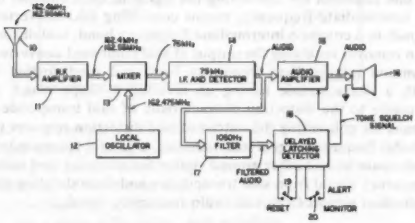
DUAL FREQUENCY FM RECEIVER

Charles Cunningham, Jr., Indianapolis, Ind., assignor to Regency Electronics, Inc., Indianapolis, Ind.

Filed July 16, 1975, Ser. No. 596,512

Int. Cl.² H04B 1/06

U.S. Cl. 325—344 **10 Claims**



1. A superheterodyne receiver for receiving frequency modulated signals on one of two frequencies which are less than 500 kHz apart comprising:

a. a local oscillator which operates at a frequency which is both independent of received signals and essentially midway between the two frequencies, said local oscillator being controlled in frequency by a piezoelectric crystal;

b. R. F. signal receiving means having a bandpass broad enough for reception of signals on either of the two frequencies;

c. a mixer for mixing signals from said R. F. signal receiving means with the output of said local oscillator;

d. an I F bandpass filter coupled to the output of said mixer for preventing signals below 10 kHz and above 250 kHz from passing through;

e. a frequency modulation detector connected to the output of said I F filter; and

f. transducer means connected to the output of said frequency modulation detector for producing audio from the detected signal.

3,974,451

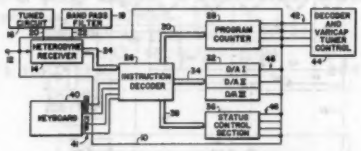
TV REMOTE CONTROLLER

Heinz B. Maeder, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed July 31, 1975, Ser. No. 601,119

Int. Cl.² H04J 3/06

U.S. Cl. 325—392 **14 Claims**



1. An asynchronous receiver for remotely controlling an apparatus comprising:

a. input stage means for receiving during successive receiving cycles an incoming signal comprising repetitive groups of serially received frequency bursts, each burst having one of a plurality of frequencies, said incoming signal having a frequency range residing between harmonic frequencies of interfering signals;

b. frequency divider means for sequentially generating a plurality of localizer frequencies at a first output terminal means and a plurality of timing signals at a second output terminal means, each timing signal being associated with one of said plurality of localizer frequencies.

c. mixing means coupled to said input stage means and to said first output terminal means for generating sum and difference signals in response to said incoming signal and said plurality of localizer frequencies;

d. detector means coupled to said mixing means for transmitting signals of a selected frequency and amplitude range; and

e. gating means coupled to said detector means and to said second output terminal means, each being responsive to one of said plurality of timing signals, for generating during said successive receiving cycles successive groups of digital signals, each of said digital signals being representative of one of said plurality of received frequency bursts.

3,974,452

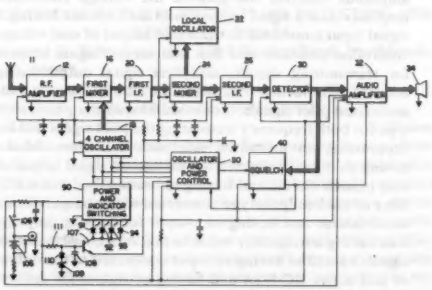
BATTERY POWERED SCANNING RECEIVER WITH SYNCHRONOUS POWER CYCLING THROUGH ELECTRICALLY OPERABLE VISUAL INDICATORS

Charles Cunningham, Indianapolis, Ind., assignor to Regency Electronics, Inc., Indianapolis, Ind.

Filed Sept. 6, 1974, Ser. No. 503,748

Int. Cl.² H04B 1/32

U.S. Cl. 325—470 **21 Claims**



1. In a multi-frequency signal-seeking receiver of the superheterodyne type which includes:

a. local oscillator means having a plurality of frequency determining means for providing local oscillations of different frequencies corresponding to different channels:
b. RF and IF signal handling means consisting of:
1. A mixer coupled to said local oscillator for mixing received radio frequency signals with the local oscillations from said local oscillator means,
2. RF signal receiving means for providing sufficient RF signal level for said mixer and
3. IF and detector means for converting modulated intermediate frequency signals produced by said mixer to audio frequency signals;
c. audio means for converting said audio frequency signals to sound for listening;
d. a plurality of electrically operable visual indicators, there being one visual indicator associated with each of said frequency determining means;
e. automatic stepping means which is defeatable and which has a plurality of outputs which are coupled to said oscillator means for automatically stepping said oscillator means through said given plurality of frequency determining means and operating each of said visual indicators when its associated frequency determining means is operative;
f. locking means which is connected to the automatic stepping means for defeating said automatic stepping means as long as an RF signal is being received and allowing resumption of operation of said stepping means when no signal is being received;
g. squelch means for muting said audio means during automatic operation of said stepping means; and
h. battery supply means for permitting the entire receiver to operate from batteries, the improvement which comprises means for sequentially connecting said plurality of electrically operable visual indicators one at a time in series with the battery supply connection to at least a portion of said RF and IF signal handling means to provide power thereto.

3,974,453

STEREOPHONIC SIGNAL DEMODULATOR FOR A PAIR OF COMPOSITE SIGNALS WITH DIFFERENT AC SIGNAL LEVELS AND THE SAME DC SIGNAL LEVEL

Mitsuo Ohsawa, Fujisawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 10, 1975, Ser. No. 548,737

Claims priority, application Japan, Feb. 15, 1974, 49-18779; Feb. 15, 1974, 49-18780

Int. Cl.[2] H03D *3/18, 3/24;* **H04H** *5/00*

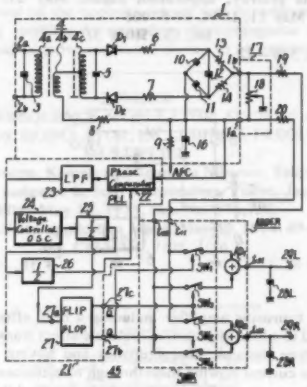
U.S. Cl. 329—50 **14 Claims**

1. A method of demodulating a composite stereo signal including a main channel signal and a sub-channel signal modulated onto a carrier, comprising the steps of:

producing a pair of composite stereo signals having opposite polarities and different signal levels by attenuating the AC level of one of said pair of composite stereo signals with respect to the other while maintaining the DC levels of said pair of composite stereo signals substantially equal to establish a predetermined level ratio between said pair of composite stereo signals, said attenuated signal having a level substantially equal to said respective crosstalk components;

demodulating the one of said pair of composite stereo signals having the greater signal level to produce respective channel output signals, each output signal having a respective crosstalk component; and

adding the other of said pair of composite stereo signals to said respective channel output signals to cancel said



respective crosstalk component in each channel output signal.

3,974,454

LASER AMPLIFIERS

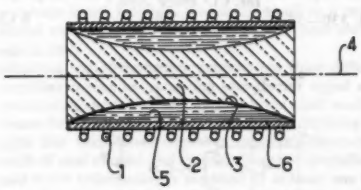
Bernard Sturel, Saint-Cheron, France, assignor to Compagnie Generale d'Electricite, Paris, France

Filed Jan. 14, 1975, Ser. No. 540,763

Claims priority, application France, Feb. 5, 1974, 74.03796

Int. Cl.[2] H01S *3/05, 3/00*

U.S. Cl. 330—4.3 **2 Claims**

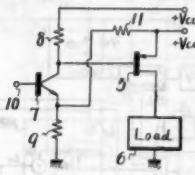


1. In a laser amplifier comprising an element having the shape of a straight cylinder of revolution about an axis, said element being able to amplify a radial gaussian laser beam crossing through the element along said axis, and a source of light power surrounding said element and capable of radially illuminating the element, the improvement in which said element comprises a first internal portion constituted by a doped glass bar having a shape defined by a revolution surface obtained by rotation of a curve arc about said axis, said curve are turning its convexity towards the axis and stretching from an end to the other end of the element, and a second portion surrounding the internal portion, said second portion constituted by a liquid having a refraction index matching that of the said doped glass, whereby the detrimental effect of the diffraction caused by the passing of the radial gaussian beam through said element is decreased.

3,974,455
TRANSISTOR AMPLIFIER

Kazuhiko Kamimura, Yokohama, and Tadao Yoshida, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 15, 1975, Ser. No. 577,678
Claims priority, application Japan, May 21, 1974, 49-57004; May 21, 1974, 49-57005
Int. Cl.² H03F 3/16
U.S. Cl. 330—22 29 Claims

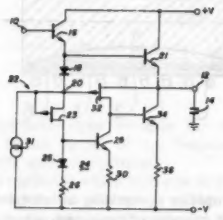


1. A transistor amplifier including a field effect transistor coupled to a load impedance, said field effect transistor having triode-type dynamic characteristics and having a stabilized DC bias current flowing therethrough notwithstanding fluctuations in a source of operating voltage coupled thereto, comprising: a transistor having an input electrode for receiving a signal and a pair of output electrodes; means for coupling one of said output electrodes to the gate electrode of said field effect transistor to apply a voltage thereto; means for injecting a portion of the fluctuations in said source of operating voltage into the other output electrode of said transistor to thereby vary the voltage applied to said field effect transistor gate electrode by said one output electrode of said transistor; and means for supplying a second operating voltage to said transistor.

3,974,456
AMPLIFIER OUTPUT STAGE

Ronald W. Russell, Sunnyvale, and Kyle M. Black, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 12, 1975, Ser. No. 549,197
Int. Cl.² H03F 3/16
U.S. Cl. 330—35 6 Claims

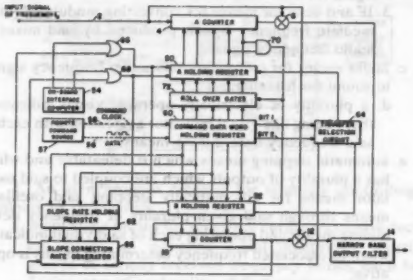


1. An amplifier output stage having at least an input and an output terminal, said stage comprising:
a current sinking transistor having one of its collector and emitter coupled to said output terminal;
an FET coupled between said output terminal and the base of said transistor;
means for supplying an input signal to the gate of said FET;
means for maintaining the gate-source voltage of said FET constant; and
a first emitter-follower having its base coupled to said input terminal and one of its emitter and collector coupled to said output terminal.

3,974,457
TIME AND FREQUENCY CONTROL UNIT

Alvin G. Bates, Clarksville, and Terrence L. McGovern, Laurel, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 615,023
Int. Cl.² H03B 3/04
U.S. Cl. 331—1 A 10 Claims



1. A time and frequency control unit comprising:
an input reference oscillator signal of frequency, f_o,
a first counter, having f_o as an input, for producing an output signal at a frequency f_o/a, where a is a first modulus number,
a first mixer connected to the A counter for mixing the reference oscillator signal with the output from said first counter to produce a signal of frequency

$$f_1 = \frac{f_o}{a} + f_o,$$

a second counter connected to the output of said first mixer for producing an output signal at frequency f_1/b, where b is a second modulus number,
a second mixer connected to the output of said second counter for mixing the output from said second counter with said reference oscillator signal to produce a signal of frequency

$$f_o \pm \frac{f_1}{b},$$

and
means connected to the output of said second mixer for setting the operation sign of the second mixer output at plus or minus, the output determined therefrom having a constant frequency f_f.

3,974,458
DUAL FIELD EXCITATION FOR A CARBON DIOXIDE LASER

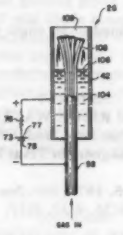
Sol Aisenberg, Natick, and Kuo Wei Chang, Lexington, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 453,241, March 21, 1974. This application Oct. 21, 1975, Ser. No. 624,370
Int. Cl.² H01S 3/097, 3/22
U.S. Cl. 331—94.5 PE 6 Claims

1. An electron discharge device comprising:
a. a primary discharge region having first and second ends defining a cavity;
b. a plurality of spaced electrode structures at said first end of said region, each electrode structure including a cathode structure in the form of a plurality of capillary tubes bunched together and open at both ends to permit the

flow of gas through the length thereof and an anode spaced from, surrounding, and extending over the lengths of said tubes;

c. means for supplying first and second different potentials to said discharge device, said first potential being supplied between the anode and cathode of each said electrode structure thereby producing an auxiliary discharge region therebetween;



d. a gas source for supplying gas to each said electrode structure, said gas reacting with said auxiliary discharge region to form a plasma, whereby the combined effect of the reaction of said plurality of electrode structures forms a virtual plasma cathode; and

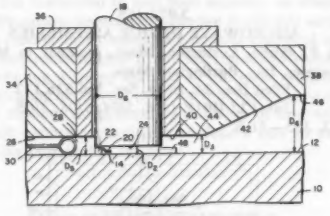
e. a primary anode at said second end of said primary discharge region, said second potential being supplied between said primary anode and said plurality of electrode structures, whereby said primary anode attracts electrons from said virtual plasma cathode.

3,974,459

MILLIMETER WAVEGUIDE OSCILLATOR AND AMPLIFIER STRUCTURE

Kenneth P. Weller, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 23, 1975, Ser. No. 589,107
Int. Cl.[2] H03B *7/14*; H03F *3/10, 3/60*
U.S. Cl. 331—96 **14 Claims**



11. A waveguide structure operative with negative resistance devices at frequencies up to 170 GHz or higher including in combination:

a. a waveguiding member having one major surface thereof for confining wave propagation along a predetermined path and direction,

b. a negative resistance device supported by said waveguiding member at a chosen location on said major surface,

c. a conductive impedance transforming member having an end surface facing said waveguiding member and connecting said negative resistance device adjacent one edge of said end surface, so that the remainder of said end surface serves to transform the impedance of said negative resistance device by a predetermined amount,

d. a waveguide wall adjacent both one side of said impedance transforming means and said negative resistance device, said waveguide wall forming, with said major surface of said waveguide member, a tuning cavity of predetermined height into which a moveable tuning member is received, and

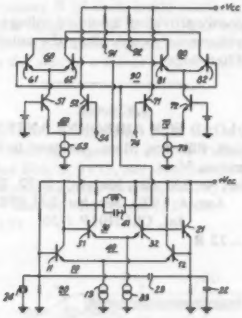
e. impedance matching and waveguide transition means positioned on the opposite side of said impedance transforming member for coupling electromagnetic energy from said negative resistance device to an external load.

3,974,460

HIGH FREQUENCY MODULATOR, SUCH AS AN AMPLITUDE MODULATOR, INCLUDING A FREQUENCY MULTIPLIER

Masayuki Hongu, Komae, and Tsutomu Niimura, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 12, 1975, Ser. No. 576,737
Claims priority, application Japan, May 30, 1974, 49-61181
Int. Cl.[2] H03C *1/06, 1/36*
U.S. Cl. 332—31 T **10 Claims**



1. Apparatus for high-frequency modulation, comprising:

means for supplying a base oscillating signal;

frequency multiplying means including first differential amplifier means having a pair of output terminals, said frequency multiplying means receiving said base oscillating signal and producing at said pair of output terminals a carrier signal having a frequency equal to a predetermined multiple of the frequency of said base oscillating signal; and

modulating means including second and third differential amplifier means for receiving said carrier signal and for modulating same with input information, said modulating means being coupled to said frequency multiplying means such that said carrier signal is applied differentially to each of said second and third differential amplifiers and said input information is supplied to at least one of said second and third differential amplifiers; said second differential amplifier having a pair of output terminals connected, respectively, to a pair of output terminals of said third differential amplifier, the connected output terminals having opposite phase relationships with respect to each other when said carrier signal is differentially applied to said second and third differential amplifiers.

3,974,461

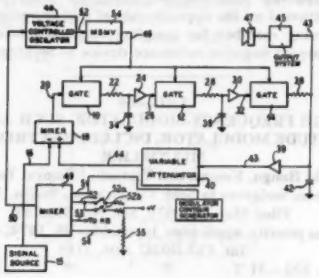
WIDE DYNAMIC RANGE VOLTAGE CONTROLLED FILTER FOR ELECTRONIC MUSICAL INSTRUMENTS

David A. Luce, Clarence Center, N.Y., assignor to Moog Music, Inc., Williamsville, N.Y.

Filed June 14, 1974, Ser. No. 479,487
Int. Cl.[2] G10H *1/04*; H03H *7/10*
U.S. Cl. 332—17 **14 Claims**

13. In an electronic musical instrument, the method of controlling the amplitude of a signal passed from a signal source to an output system, said signal source producing a

signal having a frequency within a range of frequencies, comprising the steps of providing a plurality of voltage controlled filter stages connected in cascade, providing feedback means,



and simultaneously providing a control voltage to each of said stages for simultaneously controlling the cutoff frequency of each of said filter stages.

3,974,462

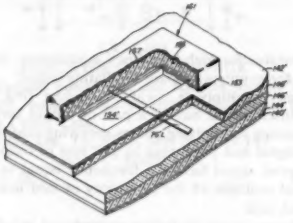
STRIPLINE LOAD FOR AIRBORNE ANTENNA SYSTEM

Matthew Fassett, Billerica, Mass., assignor to Raytheon Company, Lexington, Mass.

Division of Ser. No. 232,404, March 7, 1972. This application Apr. 4, 1972, Ser. No. 241,090

Int. Cl.² H01P *1/26*

U.S. Cl. 333—22 R **3 Claims**



3. In combination with a stripline having a plurality of coupling openings formed through one ground conductor thereof, each one of such openings being assymmetrically disposed with respect to the center conductor within such stripline, a load comprising:

a. a lossy cavity overlying the coupling openings; and

b. means for affixing such cavity to the ground conductor.

3,974,463

ELASTIC SURFACE WAVE APPARATUS

Toshihiro Onodera, and Kazue Sekikawa, both of Kawasaki, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

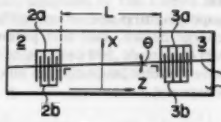
Filed Sept. 5, 1975, Ser. No. 610,890

Claims priority, application Japan, Sept. 9, 1974, 49-102991

Int. Cl.² H03H *9/32, 9/30, 9/26;* **H01L** *41/18*

U.S. Cl. 333—30 R **6 Claims**

1. An elastic surface wave apparatus which comprises a Y-cut piezoelectric substrate of lithium niobate ($LiNbO_3$) and provided with a surface defined by the X and Z axes and at least one electrode pair for converting an electric signal into an elastic surface wave which is disposed on said surface at an angle of inclination ranging betwween 0.5° and 7° relative to the Z axis so as to cause an elastic surface wave to be propagated in a direction inclined at an angle ranging from 0.5° to 7° relative to the Z axis.



3,974,464

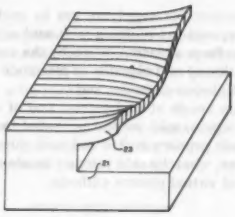
ACOUSTIC RIDGE WAVEGUIDE

Robert S. Wagers, Richardson, and Clinton S. Hartmann, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 15, 1974, Ser. No. 451,718

Int. Cl.² H03H *9/26, 9/30, 9/32;* **H01L** *41/10*

U.S. Cl. 333—30 R **9 Claims**



1. An acoustic waveguide structure comprising:

a substrate formed of a single crystal piezoelectric material and having a top surface lying in a horizontal plane; and

a wedge-shaped horizontal ledge formed of said single crystal piezoelectric material extending laterally outwardly from said substrate and having a top surface coplanar with the top surface of said substrate.

3,974,465

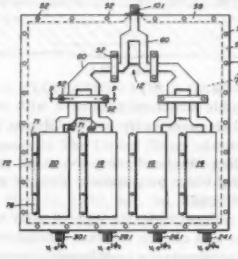
MICROWAVE DEVICE ASSEMBLIES

Joseph F. White, Lexington, Mass., assignor to Microwave Associates, Inc., Burlington, Mass.

Filed Dec. 24, 1974, Ser. No. 536,112

Int. Cl.² H01P *1/18, 5/04, 5/08, 3/08*

U.S. Cl. 333—31 R **7 Claims**



1. An electric wave phase-shift device comprising an enclosing structure, and on the outside of said structure an input terminal and a plurality of output terminals, means within said enclosing structure providing wave paths from said input terminal to each of said output terminals for guiding to each

output terminal a portion of wave energy introduced at said input terminal, individual phase shift means within said enclosing structure in each of said paths for establishing at said output terminals a prescribed phase state of each of said portions relative to the energy introduced at said input terminal wherein said phase shift means has a TEM-mode transmission line within said enclosing structure having at least a first ground-plane conductor and a strip conductor adjacent thereto, said phase-shifter having diode means with at least two electrodes, and an electrically-conductive mount therefor located adjacent said ground plane conductor, means coupling an electrode of said diode means to said mount, means coupling another electrode of said diode means to said strip conductor, and means capacitively coupling said mount to said ground plane conductor, a coupler at each of said output terminals, and an individual phase-trimming means in each of said couplers, whereby the relative phase states of wave energy available from said respective output terminals at a given instant can be adjusted without invading said enclosing structure.

3,974,466

ELECTROCHEMICAL REED FILTER

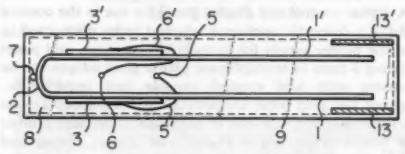
Toshiharu Tanaka, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed July 17, 1974, Ser. No. 489,102

Claims priority, application Japan, July 20, 1973, 48-85093[U]

Int. Cl.² H03H 9/06, 9/26; H01L 41/10

U.S. Cl. 333—72 **5 Claims**



1. A frequency sensitive electromechanical filter comprising, a base member, a protective casing mounted on said base member, a pair of elongated resonant reed elements with one end region of each of said reed elements being connected together and connected to said base member, an electromechanical transducer secured by adhesive to the side surface of each said reed element, means for making electrical contact with said electromechanical transducers, and shock-absorbing means including a spring secured to the inner walls of said protective casing in the vicinity of the other end region of each said reed element for preventing cracking of said adhesive and/or said electromechanical transducers due to external shocks being imparted to the filter.

3,974,467

LONG FLEXIBLE WAVEGUIDE

Susumu Tobita, Ichihara; Masashi Shimoishizaka, Yokohama; Isamu Oishi, Yokohama; Keiichi Miwa, Yokohama, and Hideo Kanda, Yokohama, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

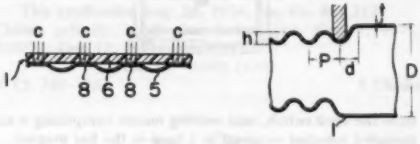
Filed May 29, 1975, Ser. No. 581,901

Claims priority, application Japan, July 30, 1974, 49-87353; July 30, 1974, 49-90926 [U]

Int. Cl.² H01P 3/14

U.S. Cl. 333—95 A **3 Claims**

1. In a long flexible waveguide which is fabricated by corrugating a thin-walled tube being circular in section and subjected to the longitudinal butt weld and then molding the thin-walled corrugated tube so as to make the shape of its section substantially rectangular, a long flexible waveguide having a substantially rectangular section comprising the fact that a corrugating pitch P falls within a range of $\lambda_g/10 < P < 2K\sqrt{D \cdot t}$ where λ_g denotes a wavelength in said waveguide, K a constant, D an outer diameter of said tube before the corrugation, and t a thickness of the wall of said tube, and that



a radius of curvature R of each inside corner of the molded tube falls within a range of $h \leq R \leq 0.46\,b$ where h denotes a depth of the corrugate form of said tube, and b a dimension of said tube on the side of a minor axis of said section.

3,974,468

CONTACT CARRIERS FOR RELAYS

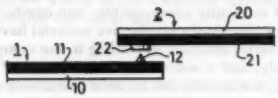
Göran Ygfors, Smastugevagen 10, 162 40 Vallingby, Sweden

Filed Feb. 3, 1975, Ser. No. 546,194

Claims priority, application Sweden, Feb. 7, 1974, 7401634

Int. Cl.² H01H 1/66, 51/00

U.S. Cl. 335—151 **14 Claims**



1. A contact carrier in strip form for electric relays, for example of reed relay type, comprising, a layer of electrically conductive nonmagnetic metal, said layer having iron plating on at least a substantial part of its surface on at least one side thereof, said plating being produced by electrochemical means and being composed mainly of pure iron with high permeability and low coercive force.

3,974,469

PERMANENT MAGNET BIASING MEANS FOR REED SWITCHES

Bryan Frederick Nicholls, Northampton, England, assignor to The Mettoy Company Limited, Northampton, England

Filed Feb. 13, 1975, Ser. No. 549,475

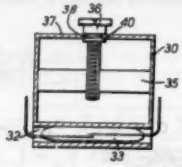
Claims priority, application United Kingdom, Feb. 14, 1974, 6831/74

Int. Cl.² H01H 1/66

U.S. Cl. 335—153 **1 Claim**

1. A magnetic switch assembly arranged to be responsive to a change in magnetic conditions near said assembly, the assembly comprising a reed switch having switch reeds, a housing for retaining said reed switch, a permanently magnetised bar magnet in said housing for producing a biasing ambient magnetic field around said reed switch, said bar magnet being mounted with its magnetic axis parallel to and in the plane of movement of said switch reeds, means for moving said bar magnet towards and away from the reed switch in the direction of movement of the switch reeds to alter the biasing magnetic field, and guide means on the interior walls of the housing abutting the bar magnet to maintain the magnetic axis

of the bar magnet parallel to and aligned with the axis of the reed switch during movement of the magnet towards and away

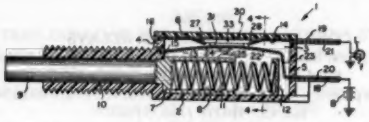


from the reed switch, said moving means comprising a screw threaded member received in a bore in the bar magnet.

3,974,470
MULTI-STAGE SWITCHING APPARATUS

Gideon A. DuRocher, Mount Clemens, Mich., assignor to Essex International, Inc., Fort Wayne, Ind.

Division of Ser. No. 517,490, Oct. 24, 1974, Pat. No. 3,918,020. This application Aug. 1, 1975, Ser. No. 601,217
Int. Cl.² H01C *13/00*
U.S. Cl. 338—114 **10 Claims**

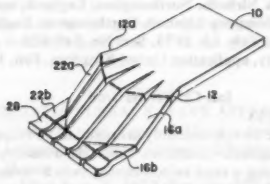


1. An electrical switching device comprising a first body composed of resiliently compressible, non-conductive material containing electrically conductive material having a resistance which varies inversely according to the compression of said first body; and a second body composed of resiliently compressible, non-conductive material containing electrically conductive particles having a substantially uniform resistance lower than that of said conductive material, one of said bodies having an opening extending therethrough and in which the other of said bodies is accommodated.

3,974,471
BRUSH CONTACT

Ralph Wilson Gilliland, Glenview, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed July 30, 1975, Ser. No. 600,346
Int. Cl.² H01C *1/12*
U.S. Cl. 338—202 **8 Claims**

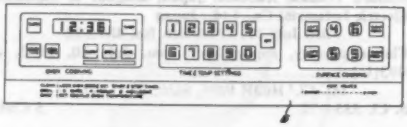


1. A miniature multifingered wiper brush contact for use with a potentiometer, variable resistor or like assembly and comprising a body portion for attachment to an operator in the assembly, and multiple fingers projecting from root connections with the body portion and each finger extending downwardly from a transverse bend line thereacross adjacent a corresponding root connection to provide a strut portion terminating in a contact tip portion, the aggregation of the individual bend lines substantially defining an arc concave toward the body portion, the opposing side edges of adjacent fingers being laterally spaced in the vicinity of the bend lines, the bend lines reorienting the strut portions so that the opposing side edges of adjacent fingers in the vicinity of the tip portions are more closely spaced than at the bend lines, the fingers thereby being adapted to flex independently while providing a maximum density of contact tip portions along a given line of contact.

3,974,472
DOMESTIC APPLIANCE CONTROL AND DISPLAY PANEL

Robert R. Gould, Jr., Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 457,760, April 4, 1974, Pat. No. 3,886,539, which is a division of Ser. No. 318,172, Dec. 26, 1972, Pat. No. 3,819,906. This application May 5, 1975, Ser. No. 574,513
Int. Cl.² G08B *5/36*
U.S. Cl. 340—337 **7 Claims**



1. A digital control and display panel for use in the control console of a domestic appliance adapted to be connected to a domestic power supply for household operation, said panel comprising a pane of strengthened planar glass adapted to be coextensive with said control console and imperforate throughout for easy wipe cleanability and a printed circuit board located at the rear side of said glass pane, said printed circuit board supporting a plurality of display means and digital logic means, said glass pane having an opaque paint surface of nonconductive material on the rear side thereof defining a transparent area in front of each of said display means so a user may view said display means, and touch control means for programming said appliance, said touch control means including a plurality of conductive address pads on the front side of said glass pane respectively identifiable with said plurality of display means and with each address pad having an associated conductive drive pad and conductive sense pad applied to said paint surface on the rear side of said glass pane, said digital logic means implemented in at least one monolithic integrated circuit chip and responsive to the user's touch of an address pad for enabling a respective one of said display means to display a program entry as a visual feedback to the user.

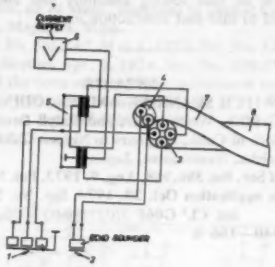
3,974,473
CABLE FOR MULTIPLE SONAR SYSTEMS

Carl Wilhelm Busch, Bremen, and Wolfgang Stedtnitz, Neukrug, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Apr. 30, 1975, Ser. No. 573,092
Claims priority, application Germany, May 7, 1974, 2421878
Int. Cl.² G01S *7/52, 9/68*
U.S. Cl. 340—3 D **13 Claims**

1. In a system composed of a plurality of sonar devices mounted on a ship and arranged to operate simultaneously, each device being composed of two units between which electrical signals pass during operation of the device and conducting means connected for conveying such signals between the units, the improvement wherein, for all of said devices, said conducting means comprise plurality of multi-

conductor cores, at least one core being associated with each said device, with all of said cores being twisted together to



form a common spiral multicore cable, whereby the spiral form of said cable produces a low level of interference between the signals in different ones of said cores.

3,974,474

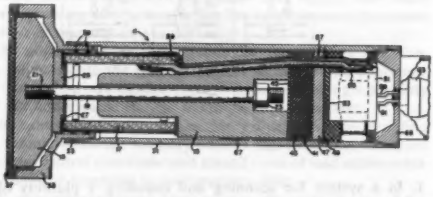
UNDERWATER ELECTROACOUSTIC TRANSDUCER CONSTRUCTION

Louis M. Izzo, Fayetteville, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed June 4, 1973, Ser. No. 366,454

Int. Cl.² H04B *13/00*

U.S. Cl. 340—10 **3 Claims**



1. An electroacoustic transducer with damped response to very low frequency acoustic energy, comprising:

a. a piezoelectric driver element of hollow cylindrical form;

b. a head mass disposed in operative engagement with one end of said piezoelectric driver element;

c. a tail mass of cylindrical form and of inertia relatively high as compared to said head mass, disposed in operative engagement with the end of said piezoelectric driver element opposite said head mass;

d. means securing said piezoelectric driver element and said head and tail masses together with the piezoelectric element between the head and tail masses and forming a movable assembly therewith;

e. a tubular metallic housing enclosing said movable assembly;

f. compliance means mounting said movable assembly concentrically within said housing means for substantially undamped longitudinal motion therein and defining a basic resonance frequency for such motion of said assembly; and

g. damping means including a thin ring of lossy rubber compressed between the opposed outer cylindrical surface of said tail mass and inner tubular surface of said housing and providing at least frictional engagement with both said surfaces for resistively damping longitudinal movement of said tail mass by shearing action within the lossy rubber.

3,974,475

METHOD OF AND APPARATUS FOR FOCUSING ULTRASONIC WAVES IN A FOCAL LINE

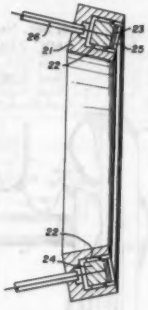
Christoph Benedikt Burckhardt, Muttenz; Pierre-André Grandchamp, Arlesheim, both of Switzerland, and Heinz Hoffmann, Grenzach, Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 294,066, Oct. 2, 1972, abandoned. This application Aug. 28, 1974, Ser. No. 501,313

Claims priority, application Switzerland, Oct. 7, 1971, 14588/71; Oct. 12, 1971, 14848/71

Int. Cl.² H04B *11/00*

U.S. Cl. 340—15 **5 Claims**



1. A transducer assembly for transmitting a substantially convergent ultrasonic field focusing in a focal line, comprising an annular arrangement of ultrasonic transducers, the operating surfaces of which define a conical transmitting surface inclined towards said focal line.

3,974,476

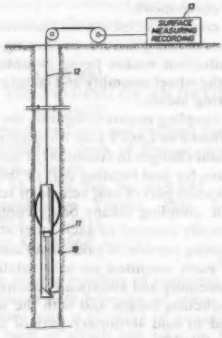
HIGHLY-DIRECTIONAL ACOUSTIC SOURCE FOR USE IN BOREHOLE SURVEYS

Christopher S. Cowles, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 25, 1975, Ser. No. 571,464

Int. Cl.² G01V *1/40*

U.S. Cl. 340—18 R **9 Claims**



1. A highly directional acoustic source for use in acoustic profile well logging systems comprising:

a tubular housing, said housing being adapted to be disposed in a well with its longitudinal axis aligned with the axis of the well;

an acoustic transducer, said transducer being mounted in one end of said tubular housing and positioned to direct an acoustic wave along the longitudinal axis of said tubular housing;

an acoustic reflector, said reflector being mounted in the other end of said tubular housing and disposed to reflect said acoustic wave into the formations surrounding the well; and

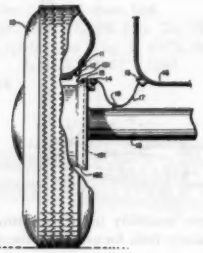
a circuit means, said circuit means being coupled to said transducer and disposed to excite said transducer simultaneously at two distinct frequencies whose difference is equal to the desired frequency of said acoustic wave, said transducer producing pressure waves whose frequencies correspond to said two distinct frequencies.

3,974,477

PNEUMATIC PRESSURE MONITORING SYSTEM

Sam R. Hester, 814 Tarpon Drive, Fort Walton Beach, Fla. 32548

Filed May 9, 1974, Ser. No. 468,280
Int. Cl.[2] B60C *23/02*
U.S. Cl. 340—58 16 Claims



1. A tire pressure monitoring system for a pneumatic tire, said tire being mounted on the rotating part of a wheel assembly of a vehicle or testing assembly wherein the rotating tire is to have its pneumatic pressure continuously monitored by pressure monitoring means mounted on said tire, wherein pressure changes from normal to abnormal and abnormal to normal produce detectable changes in condition of said pressure monitoring means and wherein it is desired to transmit said changes from said pressure monitoring means to the relatively stationary part of said vehicle or said testing assembly, comprising the following interconnected electrical and mechanical components:

electrical conduction means for transmitting said change in condition of said pressure monitoring means; said electrical conduction means being mounted on said rotating part of the wheel assembly and connected to said pressure monitoring means;

magnetic coupling means using only the law of electromagnetics known as Lenz's Law for magnetically transmitting one of said changes in condition of said pressure monitoring means for said rotating part of the wheel assembly to the stationary part of said vehicle or testing assembly; said magnetic coupling means being composed of two parts magnetically coupled to each other at each revolution of said rotating portion of said wheel assembly with the first of said parts mounted on said rotating portion of said wheel assembly and electrically connected to said electrical conduction means and with the second of said parts mounted to said stationary part of said vehicle or said testing assembly;

emf conduction means for transmitting said change in condition of said pressure monitoring means from said magnetic coupling means; said emf conduction means being mounted on said stationary part of said vehicle or said testing assembly and electrically connected to said second part of said magnetic coupling means; and

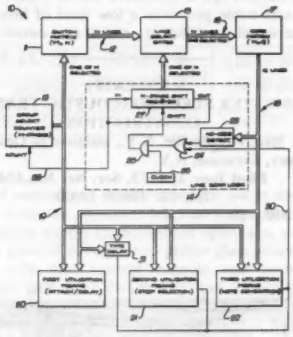
circuit sensing and indication means for sensing said change in condition of said pressure monitoring means from the normal to the abnormal condition transmitted by said second part of said magnetic coupling means and indicating said change to the operator of said vehicle or said testing assembly; said circuit sensing and indication means being mounted on said stationary part of said vehicle or said testing assembly and electrically connected to said emf conduction means.

3,974,478

KEY SWITCH SCANNING AND ENCODING SYSTEM

Glen R. Griffith, Westminster, and Ralph Deutsch, Sherman Oaks, both of Calif., assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Division of Ser. No. 386,968, Aug. 9, 1973, Pat. No. 3,899,951. This application Oct. 29, 1974, Ser. No. 518,412
Int. Cl.[2] G06F *3/02*; H04Q *9/00*
U.S. Cl. 340—166 R 12 Claims



1. In a system for scanning and encoding a plurality of switches arranged in a matrix of M groups each of which can be enabled separately, the switches in each group being connected to N commom output lines, the improvement wherein said system provides an encoded output for each actuated switch repetitively so long as that switch remains actuated, comprising:

encoding circuitry,

scanning means for sequentially gating each of said N output lines to said encoding circuitry, said encoding circuitry providing a coded signal identifying the gated line if the switch in the enabled matrix group associated with that gated line is actuated and providing no coded signal if the associated switch is open, said coded signal being provided repetitively each time said same switch is scanned so long as that switch remains actuated,

skip means, responsive to the output of said encoding circuitry, for causing said scanning means rapidly to gate the next output line to said encoding circuitry if no coded signal is provided, and if a coded signal is provided from said encoding circuitry, for causing said scanning means to dwell for a period of time sufficient to permit utilization of said coded signal, and

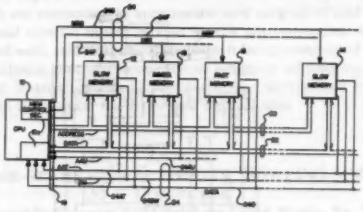
utilization means connected to the output of said encoding circuitry to receive said coded signal and to utilize both the identity of the actuated switch indicated by said coded signal and the duration of actuation of said switch as indicated by the continued repetition of said coded signal.

3,974,479

MEMORY FOR USE IN A COMPUTER SYSTEM IN WHICH MEMORIES HAVE DIVERSE RETRIEVAL CHARACTERISTICS

Alan Kotok, Waltham; Allan R. Kent, Framingham, and David A. Gross, Stow, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Division of Ser. No. 356,147, May 1, 1973, Pat. No. 3,810,110.
This application Apr. 5, 1974, Ser. No. 458,072
The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **5 Claims**



1. A memory unit for connection to a data processing system, the system including a central processor unit and a bus for connecting said memory unit to the central processor unit, the central processor unit including means for transmitting memory address signals and a memory retrieval control signal onto corresponding conductors in the bus for transfer to said memory unit thereby to cause said memory unit to transmit an address acknowledgement signal and data signals onto other corresponding conductors in the bus to the central processor unit, said memory unit comprising:

A. addressable storage means for transmitting the data signals onto the bus for transfer to the central processor unit, said addressable storage means including a plurality of addressable storage locations for storing data,

B. address decoder means for transmitting an enabling signal when the memory address signals on the bus from the central processor unit identify one of said addressable storage locations in said memory unit,

C. coincidence means responsive to the coincidence of the memory retrieval control signal on the bus from the central processor unit and the enabling signal from said address decoder for transmitting the address acknowledgement signal onto the bus for transfer to the central processor unit and for causing said addressable storage means to initiate a memory cycle during which said addressable storage means retrieves data from that storage location identified by the memory address signals and couples the corresponding data signals onto the bus, and

D. data warning means coupled to said coincidence means for transmitting over the bus to the central processor unit during each memory cycle a data warning signal a predetermined interval before said addressable storage means transmits the data signals.

3,974,480

DATA PROCESSING SYSTEM, SPECIALLY FOR REAL-TIME APPLICATIONS

Francois Gernelle, 18 avenue du Bois, 92290-Chatenay Malabry, France

Filed May 8, 1974, Ser. No. 468,299
Int. Cl.² G06F *11/04*
U.S. Cl. 340—172.5 **6 Claims**

1. Data processing system, particularly for real-time applications requiring a relatively moderate processing capability, which comprises:

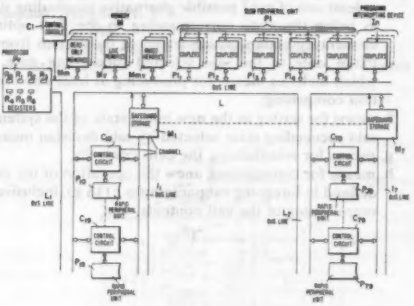
a. a processor comprising:

i. a plurality of registers,

j. means for interrupting a processing program or subprogram,

k. means for performing said processing program or subprogram, and for performing at least one subprogram necessary for a real-time application upon the occurrence of an interruption caused by said interrupting means, and subsequently, upon completion of said subprogram necessary for a real-time application, for resuming the performance of the previously interrupted program or subprogram,

b. a plurality of safeguard storages consisting each of a stack of N independent and sequentially addressable registers,



c. means for controlling a transfer of the contents of all the registers of said processor to at least one of said safeguard storages in a predetermined sequential order when a program or subprogram is interrupted and for re-loading the registers of said processor with said contents previously transferred to at least one of said safeguard storages in a sequential order reverse with respect to said predetermined order when resuming said interrupted program or subprogram,

d. and at least one bus line connecting said registers of said processor to said safeguard storages for transferring said contents, and said interrupting means to said performing means for transmitting an interrupt signal from said interrupting means to said performing means.

3,974,481

MACHINE FOR THE FINDING OF AN OPTIMUM PASSAGE

Jean Ledieu, Saint Germain en Laye, and Philippe Eschenbrenner, Saint Genest Maillifaux, both of France, assignors to Societe CYBCO, Paris, France

Filed May 14, 1974, Ser. No. 469,881
Claims priority, application France, May 14, 1973, 73.17373; Dec. 14, 1973, 73.44816
Int. Cl.² G06F *15/20*
U.S. Cl. 340—172.5 **25 Claims**

1. A digital problem solving machine of optimizer type, for the seeking of an optimum path between an initial state and a final state for a system with a plurality of quantified variables, m in number, each of which can take on N values, comprising:

a. means for setting in the sets of coordinate values of the variables corresponding to the initial and final states of the said system and for setting in the coordinate value sets corresponding to the values of the variables defining the system forbidden states, referred to as constraints;

b. a plurality of computation-and-memorization cells for handling digital contents, arranged to have their initial contents set by said setting-in means;

c. means providing for variation of the said contents in said cells by quantities appropriately defined as a function of the said constraints imposed on the system, starting from the set of initial values, the evolution of the values of the said contents by said variation being capable of consideration as simulating the propagation of a backward dummy wave which propagates step by step in a representative space receiving the said wave of the preceding adjacent points, with the exception of the points representative of constraints which do not propagate the wave, such variation for each constraint being termed processing the constraint;

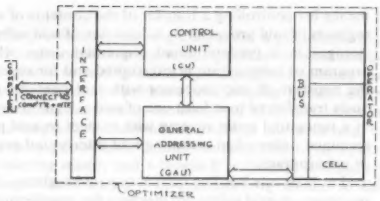
d. means for reading the finally obtained cell contents after processing each constraint, and

e. decision means using the results of the reading performed by said reading means and comparing them for selecting at least one of m+1 possible alternative succeeding states, as being the state corresponding to the first optimum elementary action, which transfers the system from the initial state to the said selected succeeding state, and which includes means for producing at least one reiteration comprising:

f. means for setting as the new initial state of the system the said succeeding state selected by said decision means,

g. means for reinitializing the cells contents,

h. means for commanding anew the operation of the means defined in foregoing subparagraphs c) to g), inclusive, for reprocessing of the cell contents, and



i. means for memorizing the set of optimum elementary actions found at each processing, which set gives by successive approximation, the said optimum route going from the initial state to the final state,

the said digital machine comprising the improvements constituted by the following characteristics:

the said computation-and-memorization cells are P in number, where $P<mN$, and constitute an operator;

each cell includes means for incrementation of its contents controlled by the aforesaid means for the setting in of coordinate values defining each constraint and includes means for sequentially delivering the said coordinate values of the constraints to the said incrementation means, the processing performed by the said operator thus being performed from constraint to constraint, and

the contents of each cell after processing of a constraint represents the difference between the number of steps performed on any one of the variables to pass the said constraint and the dummy number of steps which would lead to the same situation if the said constraint did not exist, so that the set of P contents can then be considered as representative of the difference expressed as the number of steps between the front of the said backward dummy wave and the front of the reference wave propagating in the same way as the dummy wave but not being disturbed by the said constraints.

3,974,482

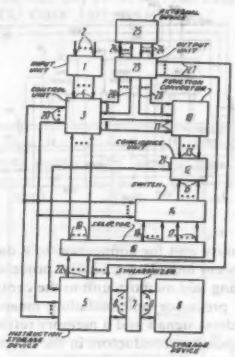
STORAGE AND DISPLAY APPARATUS

Vladimir Nikolaevich Balashov, ulitsa Druzhby, 17, kv. 2, Podolsk, Moskovskoi oblasti; Valery Timofeevich Gavich, Pleteshkovsky pereulok, 10, kv. 8; Igor Mitrofanovich Glyzdov, Chusovskaya ulitsa, 11, korpus 7, kv. 42, both of Moscow; Vladimir Semenovich Dyatlov, ulitsa Kommunisticheskaya, 12, kv. 35, Ramenskoe Moskovskoi oblasti; Verlen Nikolaevich Ermakov, Veernaya ulitsa, 3, korpus 5, kv. 265, Moscow; Jury Nikolaevich Kushelev, shosse Entuziastov, 104 V, kv. 6, Moscow, and Mikhail Nikolaevich Sosenko, Nagernaya ulitsa, 23, kv. 74, Moscow, all of U.S.S.R.

Filed Aug. 22, 1974, Ser. No. 499,848

Int. Cl.[2] G09B 7/08

U.S. Cl. 340—172.5 13 Claims



1. Apparatus for presenting information stored in the locations of a storage and display device with a set number of selection coordinates which selects said locations along at least one of said selection coordinates, comprising an input unit for receiving an input signal in the form of a binary number; a control unit connected to said input unit and intended for converting the binary code of the input instruction of said control unit into another binary number some bits of which form output instruction and the remaining bits making up a control instruction; an instruction storage device connected to said control unit; an input and an output of said instruction storage device; locations of said instruction storage device for storing instructions; each of said instructions being a binary number representing at least one address of said location with said instruction stored therein; the number of addresses of said location of said instruction storage device is equal to the number of said selection coordinates in said storage and display device; said instruction storage device which alternately selects said locations in an increasing order and connects said locations to said output of the instruction storage device as determined by said control instruction delivered from said control unit; each said location of said instruction storage device corresponds to said location of said storage device; a synchronizer connected to said instruction storage device and said storage device which synchronizes selection of said locations in said instruction storage device with selection of said locations of said storage device; a coincidence unit used to compare said output instruction storage device, with the address of one of said locations of said instruction storage device; upon coincidence of said addresses said coincidence unit generates a signal which goes to said instruction storage device and stops location selection therein; inputs and output of the coincidence unit; said first inputs of said coincidence unit are electrically connected to said control unit; said second inputs of said coincidence unit are electrically connected to said output of said instruction storage device, while said output of said coincidence unit is connected to said instruction storage device; each said location of said instruction storage

device holds an instruction in the form of a binary number comprising at least one additional address of same said location; the number of said additional addresses is equal to the number of said selection coordinates in said storage device; said apparatus comprising also a selector intended for discriminating said addresses of each of said locations in said instruction storage device; inputs and outputs of said selector; said inputs of said selector are connected to said outputs of said instruction storage device; said addresses of each of said locations in said instruction storage device are delivered to appropriate said outputs of said selector; a switch which alternately connects said locations of said instruction device to said second inputs of said coincidence unit as determined by said control instruction delivered from said control unit; inputs, control inputs and outputs of the switch; said inputs of the switch are connected to appropriate said outputs of said selector; said control inputs of said switch are connected to said control unit; said outputs of the switch being connected to the coincidence unit; the sequence of selection of said locations in said instruction storage device is also determined by said control instruction fed from said control unit.

3,974,483

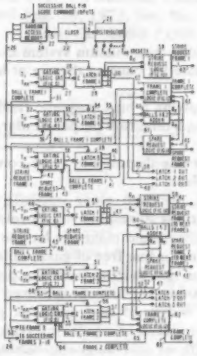
TIME-SHAREABLE AUTOMATIC BOWLING SCORE COMPUTER

Raymond D. Brunson, 5404 Brixham Court, Burke, Va. 22015

Filed Oct. 25, 1974, Ser. No. 517,864

Int. Cl.² C06F *15/02, 15/44*

U.S. Cl. 340—172.5 **12 Claims**



1. The method of automatically scoring in the game of bowling comprising the steps of:

developing in periodic time sequence on a common line, signals representing pin scores of balls successively rolled by a selected player;

applying said common line as input to each of 30 scratch memories arranged in 10 successive groups of three with each group representing a successive one of 10 scoring frames and each memory in a group of three each representing one of three possible scoring additions in that frame;

logically determining from the number of balls rolled, as determined from the number of successive pin scores on said common line, and the values of successive ones thereof, into which of said 30 scratch memories successive ones of said pin scores should be entered to represent a score addition;

gating, in time synchronism with the periodic appearance of each successive ball pin score on said common line, the value of that ball pin score into from one to three of said scratch memories as defined in the above step;

making a continuous summation of the ball pin scores in each successive group of three scratch memories with the total of the sums of all preceding groups of three scratch memories to obtain the existing bowling score, frame by frame; and resetting each of said 30 scratch memory means to zero subsequent to that period of time defined by 21 possible pin scores having been time sequenced on said common line.

3,974,484

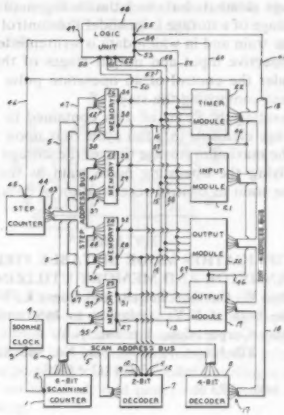
PROGRAMMABLE SEQUENCE CONTROLLER

Odo J. Struger, Chagrin Falls, and William W. Searcy, Richmond Heights, both of Ohio, assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Mar. 31, 1975, Ser. No. 563,606

Int. Cl.² G06F *9/06;* **G05B** *19/04*

U.S. Cl. 340—172.5 **11 Claims**



1. A programmable sequence controller, the combination comprising:

a set of addressable I/O circuit elements, each circuit element being coupled to a device on a machine to be controlled;

a memory for storing a control program comprised of a plurality of program steps, each program step including a set of program instructions which correspond with said addressable I/O circuit elements;

means connecting said memory to at least one of said addressable I/O circuit elements for coupling data thereto;

a step counter which is connected to said memory for selecting a program step and which is responsive to a logic signal at an input to select one of said plurality of program steps;

a scanning counter connected to said addressable I/O circuit elements and to said memory, siad scanning counter being operable to continuously and sequentially address each of said I/O circuit elements and their corresponding selected program instructions; and

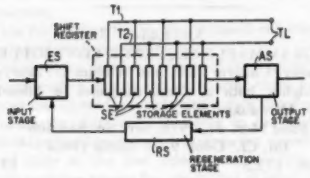
a logic unit connected to said memory and said addressable I/O circuit elements, said logic unit being responsive to the logic state of selected I/O circuit elements and their corresponding selected program instructions to generate a logic signal which advances said step counter to another program step.

3,974,485

PROCESS FOR OPERATING A CHARGE SHIFT STORE

Juergen Witte, Neuried, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 12, 1974, Ser. No. 505,332
Claims priority, application Germany, Sept. 26, 1973, 2348490
Int. Cl.² G11C 7/00, 21/00, 11/34
U.S. Cl. 340—173 DR 2 Claims



1. In a process for operating a charge shift store of individual storage elements for which data is regenerated in a regeneration stage of a storage loop under the control of a regeneration pulse train and in which data is written into and read out from respective input and output stages of the charge shift store under the control of an operation pulse train, the improvement comprising the steps of:

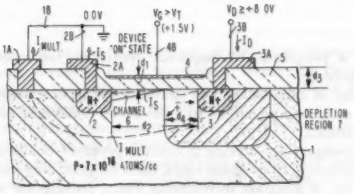
regenerating the items of data contained in the individual storage elements in a full cycle only upon the expiration of the maximum storage time of the storage elements, and applying the operating pulse train as the regeneration pulse train to control regeneration of data.

3,974,486

MULTIPLICATION MODE BISTABLE FIELD EFFECT TRANSISTOR AND MEMORY UTILIZING SAME

Huntington W. Curtis, Chelsea, and Roger L. Verkuil, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,326
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R 19 Claims



1. A memory cell for use in a monolithic memory having an array of memory cells, each said cell having the capability to assume a first distinct conductive state or a second distinct conductive state,

each said cell consisting essentially of a single N channel field effect type transistor structure having a source region, a channel region, a gate electrode, and a drain region contained on and within a substrate of P-type semiconductor material having an impurity concentration of P-type atoms in approximately the amount of 5×10^{16} to 7×10^{16} atoms per cubic centimeter;

means for applying a potential of approximately +8 volts on said drain region;

means for applying a potential of approximately +1.5 volts on said gate electrode, said gate electrode being capacitively coupled to said channel region;

means for applying a potential of approximately zero volts on said source region;

a resistor connecting said substrate to a potential of approximately −5 volts;

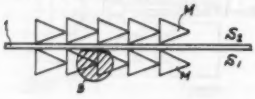
controllable switching means connected to said substrate for momentarily impressing either a potential of zero volts or a potential of −5 volts on said substrate, whereby said cell consisting essentially of a single N channel field effect type transistor structure will assume said first distinct conductive state in response to said switching means momentarily impressing a potential of zero volts on said substrate and said cell consisting essentially of a single N channel field effect type transistor structure will assume said second distinct conductive state in response to said switching means momentarily impressing a potential of −5 volts on said substrate.

3,974,487

MAGNETIC BUBBLE TRANSMISSION SYSTEM

Teruji Watanabe, Niza; Hideo Ishihara, Kamakura, and Norio Seki, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed July 8, 1974, Ser. No. 486,370
Claims priority, application Japan, July 5, 1973, 48-75289; Sept. 20, 1973, 48-106291
Int. Cl.² G11C 11/14
U.S. Cl. 340—174 TF 3 Claims



1. A magnetic bubble transmission system comprising:

a magnetic thin plate for causing therein at least one magnetic bubble;

bias means for applying a bias magnetic field to said magnetic thin plate in a direction perpendicular to the surface thereof;

a single conductor line disposed in close contact with said magnetic thin plate;

magnetic patterns disposed along opposite sides of said single conductor line to respectively develop two desired transmission paths of said magnetic bubble controlled by said single conductor line free of guide rails and disposed in such a manner that said transmission paths controlled by said single conductor are not enclosed by said single conductor, the widths of said magnetic patterns being monotoneously reduced at regular intervals in the desired transmission path of said magnetic bubble, only a side edge part of each of said magnetic patterns being in electrical contact with said single conductor line; and control means connected to said single conductor line for applying pulses into said single conductor line for reducing and restoring the intensity of said bias magnetic field in the area extending along said single conductor line to advance the bubble and for transferring said bubble between the transmission paths to a transmission path corresponding to the polarity of the pulses applied.

3,974,488

MARGIN TEST SWITCH FOR PHOTOELECTRIC INTRUDER DETECTION DEVICES

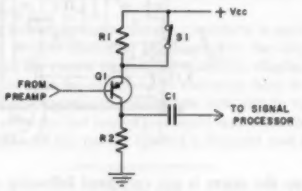
David B. Lederer, Rochester, N.Y., assignor to Detection Systems, Inc., Fairport, N.Y.

Filed Mar. 14, 1975, Ser. No. 558,296
Int. Cl.² G08B 13/00
U.S. Cl. 340—214 3 Claims

1. A photoelectric intruder detection system comprising:

(a) transmitter means for transmitting a beam of radiation

through a region under surveillance; (b) receiver means positioned in said beam to receive radiation transmitted by said transmitter means, said receiver means including a radiation-sensitive circuit means for generating a signal when the level of radiation received by said receiver means is outside a predefined range; and (c) switch means actuable for reducing the sensitivity of said circuit means by a predetermined factor,



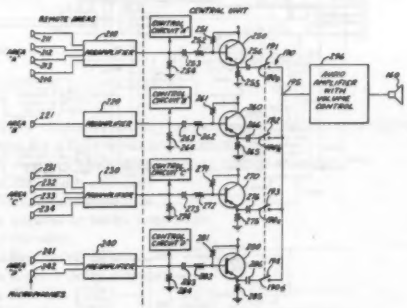
whereby upon actuating said switch means and positioning said transmitter and receiver means such that the level of radiation received by said receiver is at the threshhold required for a signal to be generated by said circuit means, and subsequently deactuating said switch means, the sensitivity of said circuit means has a margin equal to the sensitivity reduction effected by said switch means.

3,974,489

CENTRALIZED MONITOR AND ALARM SYSTEM FOR MONITORING REMOTE AREAS WITH ACOUSTICAL ELECTRIC TRANSDUCERS

George H. Bleeker, 4543 N. Dover, Chicago, Ill. 60640, and David G. Geis, 5927 W. Addison, Chicago, Ill. 60634

Filed Aug. 30, 1972, Ser. No. 284,743
Int. Cl.² G08B *13/00*
U.S. Cl. 340—261 **8 Claims**



1. A system for simultaneously monitoring a plurality of predetermined remote areas and selectively indicating an unauthorized intrusion into any of said areas, comprising:

a plurality of acousto-electric transducers positioned in said remote areas for converting an acoustical signal therein to an electrical signal having an amplitude representative of the intensity of said acoustical signal;

a plurality of amplifiers each positioned in one of said remote areas and coupled to the transducers in that area for amplifying said electrical signals;

a plurality of lamp means responsive to said amplified electrical signals for developing a visual indicator signal for each of said remote areas that systematically varies in accordance with the amplitude of said electrical signal from its associated area;

a plurality of detecting means each coupled to one of said amplifiers and responsive to the amplitude of the corresponding amplified electrical signal exceeding a predetermined threshold level indicative of an unauthorized intrusion in that area for developing an alarm signal;

a plurality of alarm indicating means each coupled to one of said detecting means and responsive to the corresponding alarm signal for indicating said unauthorized intrusion;

switching means having a corresponding plurality of input terminals respectively coupled to said amplified electrical signals and an output terminal for selectively coupling any one of said electrical signals to said output terminal, said switching means also operable to selectively couple all of said electrical signals to said output terminal;

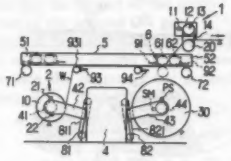
and means including an electro-acoustic transducer coupled to said output terminal for converting said selected amplified electrical signal into an acoustical signal.

3,974,490

PAPER ROLL DIAMETER SENSING DEVICE FOR USE WITH PAPER SPLICING APPARATUS

Yasuharu Mori, Amagasaki, Japan, assignor to Rengo Co., Ltd., Osaka, Japan

Filed July 26, 1974, Ser. No. 492,172
Claims priority, application Japan, June 1, 1974, 49-62267
Int. Cl.² G08B *21/00*
U.S. Cl. 340—268 **6 Claims**



1. A paper roll diameter sensing device for use with paper splicing apparatus of the type splicing the running paper sheet or web unrolled from one paper roll supported by a paper roll supporting stand to the leading end of another paper roll which is also supported by said paper roll supporting stand and which has not yet unrolled, said paper roll diameter sensing device comprising;

a guide roll adapted to rotate in contact with the running paper sheet or web unrolled from said one paper roll;

first pulse generator means responsive to the rotation of said guide roll to generate one pulse for each rotation of said guide roll in the provision of a first pulse train having a pulse repetition rate indicative of a predetermined roll diameter at a given velocity of said web;

second pulse generator means responsive to the rotation of said one paper roll to generate one pulse for each rotation of said one paper roll in the provision of a second pulse train having a pulse repetition rate indicative of the varying diameter of said one paper roll at said given velocity of said web; and

electrical means responsive to said first and second pulse trains to generate an output signal when the pusle repetition rates of said first and second pulse trains are coincident to indicate the reduction of the varying diameter of said one paper roll to said predetermined diameter, said electrical means comprising a selector circuit means responsive to at least one of said pulse trains to divide the said one of said pulse trains from one of said first and second pulse generator means into an odd-numbered pulse train and an even-numbered pulse train, the pulses of which occur in regular sequential alternation one with the other; and

a discriminator circuit means responsive to said pulse trains as modified by said selector circuit means generating said output signal when the pulses in said respective pulse

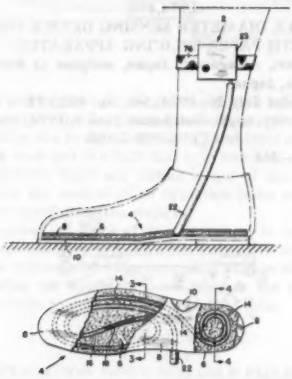
trains occur in a predetermined alternating sequence with one another over a predetermined consecutive number of pulses in said respective pulse trains, said predetermined alternating sequence occurring when the pulse repetition rate of the pulses generated by said first pulse generator means coincides that of the pulses generated by the second pulse generator means.

3,974,491

LOAD SIGNALING DEVICE FOR A PATIENT'S FOOT

John Joseph Sipe, Philadelphia, Pa., assignor to Smithkline Corporation, Philadelphia, Pa.

Filed July 22, 1974, Ser. No. 490,313
Int. Cl.² G01D *21/04*; A61B *5/00*; G01M *19/00*
U.S. Cl. 340—272 **5 Claims**



1. A device for signaling a patient when a predetermined load is placed on the patient's foot comprising:

a resilient foot pad having a toe end and a heel end and adapted to overlie the inner sole of a shoe.

a resilient tube mounted within said pad, said tube extending from adjacent the toe end of the pad to adjacent the heel end of the pad,

a liquid filling said tube,

signaling means,

pressure responsive means in communication with the liquid in said tube to control the actuation of said signaling means at a predetermined pressure of said liquid.

3,974,492

ALARM SYSTEM

Fahir Girismen, 372 Baldwin Road, Carlisle, Mass. 01741

Filed May 7, 1974, Ser. No. 467,654
Int. Cl.² G08B *13/22*
U.S. Cl. 340—280 **14 Claims**

1. A security system for detecting the electrical disconnection of electrical equipment which connects by a power plug to a power receptacle of a power system comprising,

a detection terminal connected to the power system by the plug,

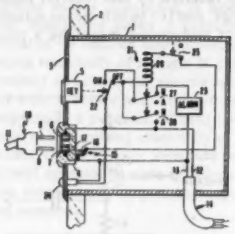
first, second and third switches, each having two states of conduction,

means for controlling the states of said second and third switches, whereby said states depend upon the energization of the control means,

an electrically energized alarm device,

the first switch, the second switch and the alarm being in electrical series across a power line of the power system, and

the first and third switches each energizing the control means when the detection terminal is connected to the power line by the plug,



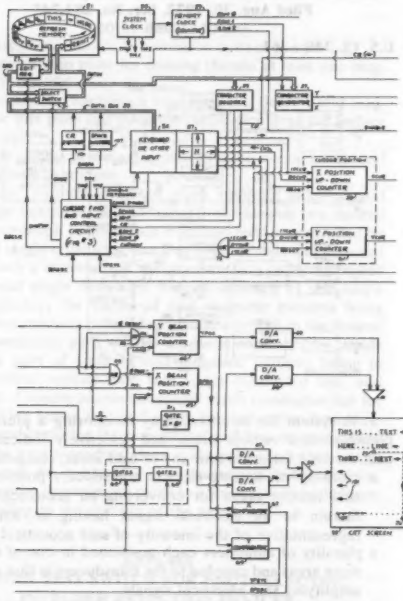
whereby the alarm is not energized following insertion of the plug into the receptacle and changing the position of the first switch and thereafter, the alarm is energized if the plug is removed from the receptacle.

3,974,493

CURSOR FIND SYSTEM FOR THE DISPLAY OF A WORD PROCESSING SYSTEM

Patrick P. de Cavaignac, Parsippany, N.J., and Peter D. Dickinson, Monte Sereno, Calif., assignors to Vydec, Inc., Whippany, N.J.

Filed Apr. 29, 1974, Ser. No. 464,990
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 AD **15 Claims**



1. A method for editing multi-character lines of text including alphanumeric symbols and formatting symbols comprising:

storing said lines of text contiguously in a refresh memory with an end-of-line symbol at the end of each line of characters;

sequentially reading characters of text out of said refresh memory;

displaying the characters of text read out of said refresh memory, including starting a new line of text in response to each end-of-line symbol read out of said refresh memory;

designating with a cursor symbol a character display position to be edited; and

selectively altering the text stored in said refresh memory, including

adding predetermined character symbols in said memory after the last character in a line when the display position of the cursor symbol is beyond the display position of said last character and in the same line; and

adding predetermined end-of-line symbols in said memory after the last line of displayed text when the display position of the cursor symbol is beyond said last line.

3,974,494

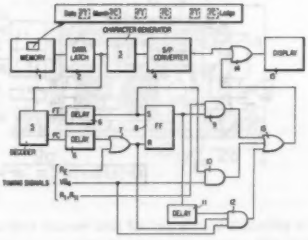
CHARACTER DISPLAY APPARATUS FOR PROVIDING A VIEWING FRAME FOR A DATA INPUT AREA

Eizo Yamazaki, and Osamu Watanabe, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 16, 1975, Ser. No. 541,599

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 AD **1 Claim**



1. A character display apparatus for providing a viewing frame for a data input area comprising:

a memory element for storing textual material,

a data latch element,

a character generator,

a parallel to series converter,

a decoder,

a first delay element,

a second delay element,

a first OR gate,

a flip flop,

a first AND gate,

a second AND gate,

a third delay element,

a third AND gate,

a second OR gate,

a third OR gate,

a display panel for displaying the textual material and input data and for displaying a viewing frame about the input data,

means connecting the output of the memory element to the input of the data latch element,

means connecting the output of the data latch element to the input of the decoder and to the input of the character generator,

means connecting the output of the character generator to the input of the parallel to series signal converter,

means connecting the output of the parallel to series signal converter to a first input of the third OR gate,

means connecting the output of the third OR gate to the input of the display panel,

means connecting a first output of the decoder to the input of the first delay element,

means connecting a second output of the decoder to the input of the second delay element,

means connecting the output of the first delay element to a S input of the flip flop and to a first input of the second AND gate,

means connecting the output of the second delay element to a first input of the first OR gate,

means connecting a line for receiving a raster end signal to a second input of the first OR gate,

means connecting a line for receiving a character video timing signal to a second input of the second AND gate and to a third input of the third AND gate,

means connecting a line for receiving raster signals to a first input of the first AND gate,

means connecting the output of the first OR gate to a second input of the third AND gate and to a R input of the flip flop,

means connecting the output of the flip flop to the input of the third delay element and to a second input of the first AND gate,

means connecting the output of the third delay element to a first input of the third AND gate,

means connecting the output of the first AND gate to a first input of the second OR gate,

means connecting the output of the second AND gate to a second input of the second OR gate,

means connecting the output of the third AND gate to a third input of the the second OR gate, and

means connecting the output of the second OR gate to a second input of the third OR gate.

3,974,495

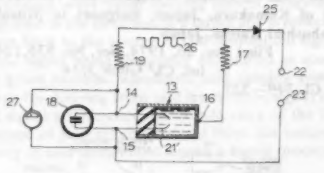
COULOMETRICALLY TIMED INDICATOR LAMP CIRCUITS OPERABLE FROM HIGH VOLTAGES

John Paul Jones, Wayne, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 10, 1975, Ser. No. 548,445

Int. Cl.² G08B *1/00*; G04F *8/00*, *10/00*

U.S. Cl. 340—309.1 **8 Claims**



1. A coulometric timing device comprising in combination, a coulometric cell having an erodable electrode with two terminal connectors thereto extending from the cell, an electronic coulometric timing circuit connected to cause said erodible electrode to develop a discontinuity between said terminals, means for coupling a two terminal electric source to produce a potential across said discontinuity, a light emitting diode circuit connected across said two terminal connectors to emit visible light only when a discontinuity is encountered in said filament wire and means limiting the current from said source to said terminal connectors and said light emitting diode.

3,974,496
DATA ENTRY SYSTEMS

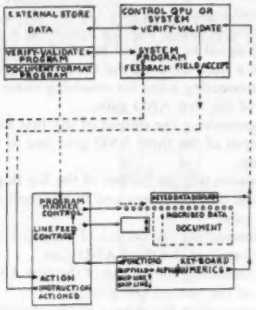
Bernard Aptroot-Soloway, 6 Sylva Court, Putney Hill, London SW15, England

Continuation-in-part of Ser. No. 425,820, Dec. 18, 1973, abandoned. This application Oct. 30, 1974, Ser. No. 519,250

Claims priority, application United Kingdom, Dec. 19, 1972, 58513/72

Int. Cl.² G08B 5/36

U.S. Cl. 340—337 **13 Claims**



2. A data entry system including a data processing machine comprising:

a keyboard, operated by an operator, including means for generating signals, means for feeding said signals generated by said keyboard into said data processing machine, said signals corresponding to data read by the operator from a source information carrier, said data processing machine including means for producing instructions for the operator to determine which data on said source information carrier is to be keyed in with said keyboard, means for visually displaying said instructions, and a document feeder including a plate for supporting said source information carrier in a position to be read by the operator, said means for visually displaying being located in juxtaposition to said plate.

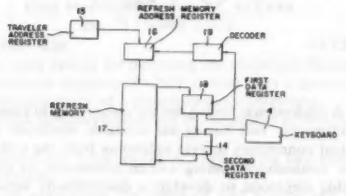
3,974,497
DISPLAY DEVICE

Kiyoto Ohkawa; Osamu Watanabe, and Yoshiteru Nakamura, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 20, 1974, Ser. No. 535,124

Int. Cl.² G06F 3/14

U.S. Cl. 340—337 **5 Claims**



1. A display device having character display functions comprising:

means for designating a digit designating region on a display screen where only digits and specific symbols attendant to digits are displayed;

means for designating by specific data the position of the least significant place of the digit to be displayed;

a refresh memory for storing display data;

an address register for designating a specific address in the refresh memory;

a first data register for registering the data of an address designated by the address register;

a second data register for temporarily storing an external input data and supplying such data to the refresh memory;

means for discriminating whether or not the output from the first data register is of the specific data; and

means for introducing an external input digit into the least significant digit place designated by the digital display region designating means, and, at the same time, carrying the existing digit.

3,974,498
SWITCHING ARRANGEMENT FOR THE TRANSFORMATION OF DIGITAL ANGLES INTO ANALOG SINE-AND/OR COSINE VALUES

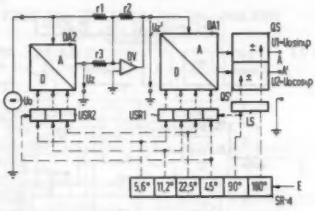
Hans Josef Knier, Penzberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 2, 1974, Ser. No. 528,941

Claims priority, application Germany, Dec. 3, 1973, 2359953

Int. Cl.² H03K 13/04

U.S. Cl. 340—347 DA **13 Claims**



1. A switching arrangement for generating analog approximations of trigonometric functions in response to digital representations of angle, said arrangement including a constant amplitude reference source, and a converter output for supplying an analog output, and further comprising:

a. first digital-to-analog converter circuitry interposed between said constant amplitude reference source and said converter output and responsive to input digital angle values at least in the range of 0° to 45° to provide analog approximations of at least one trigonometric function selected from the sine function and the cosine function at said converter output, said first converter circuitry including a first resistance network comprising a first set of *n* individual resistors having respective resistance values selected to be functions of successive powers of 2,

b. a digital control register having a series of register stages for registering a digital angle value and including at least *n* register stages sufficient to represent digital angle values in a range of 0° to 45° with such *n* register stages representing respective angle values which are functions of successive powers of 2,

c. a first switching circuit connected with said first resistance network and operable for connecting said individual resistors in respective first circuit configurations to approximate successive values of the trigonometric function, said first switching circuit being coupled with said *n* register stages of said digital control register and being responsive to respective digital angle values therein to connect said resistors in respective corresponding circuit configurations to approximate the trigonometric function corresponding to the respective digital angle values,

d. a correcting circuit interposed between said constant amplitude reference source and said converter output and comprising second digital-to-analog converter circuitry including a second resistance network with a second set of resistors having values which are functions of successive powers of 2, and

e. a second switching circuit connected with said second resistance network and being operable for connecting said second resistance network in respective second circuit configurations to generate a correction function, said second switching circuit being connected with register stages of said digital control register and controlling the second resistance network to provide a correction function having maxima at odd multiples of 45° and minima at even multiples of 45° and having respective values in each of the respective second circuit configurations to modify the analog output at said converter output to more closely approximate the trigonometric function.

3,974,499

CONTACTLESS BUZZER

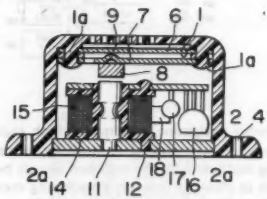
Youjiro Shigemori, and Yoshio Mitumori, both of Shizuoka, Japan, assignors to Star Seimitsu Kabushiki Kaisha, Japan

Filed Dec. 6, 1974, Ser. No. 530,410

Claims priority, application Japan, Dec. 12, 1973, 48-144362; Dec. 14, 1973, 48-141504; Feb. 18, 1974, 49-19948

Int. Cl.² G10K *1/00*

U.S. Cl. 340—392 **3 Claims**



1. A contactless buzzer unit having a case encasing a working coil, an iron core, a vibrator and a resonator, the resonator being brought into its resonating state by being struck by said vibrator, said vibrator being brought into an oscillating condition by periodical magnetization of said iron core by means of periodical energization of said coil, wherein:

said unit is characterized by said case being made from a plastic resin material by molding and representing first and second mutually parallel plane surfaces, each being formed with a plurality of depending stud posts; those posts formed integrally on said first plane surface serving as guide and fixing means for attaching an audible signal delivery means comprising said resonator, a spacer and said vibrator, to said case, and those posts formed integrally on said second plane surface serving as a guide and fixing means for attaching a base section comprised of a base plate mounting an electromagnetic drive unit comprising said iron core and said working coil.

3,974,500

VELOCITY SENSING APPARATUS

Lester I. Goldfischer, New Rochelle, N.Y., assignor to The Singer Company, Little Falls, N.J.

Filed Jan. 13, 1975, Ser. No. 540,638

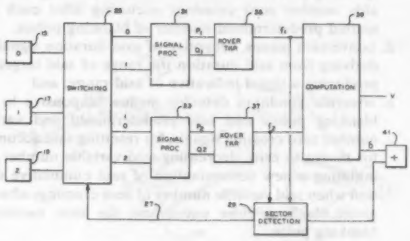
Int. Cl.² G01S *9/46, 9/48*

U.S. Cl. 343—8 **14 Claims**

12. A method of determining velocity using a single means to illuminate an area on the ground with radar energy and three receiving antennas having their centers on the apexes of an equilateral triangle to receive reflected radar energy there from comprising:

a. grouping the outputs of the three antennas into two pairs with a common antenna in each pair:

b. determining for each pair a direct sum of the two outputs and a quadrature sum of the two outputs;



c. computing the crossover frequency of the direct and quadrature sum in each pair; and

d. using the two computed frequencies to determine velocity.

3,974,501

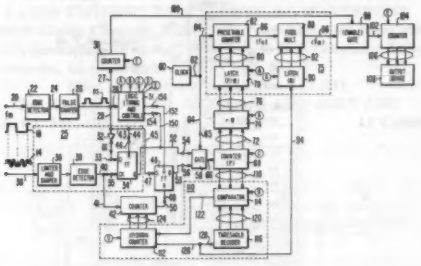
DUAL-MODE ADAPTIVE PARAMETER PROCESSOR FOR CONTINUOUS WAVE RADAR RANGING SYSTEMS

Andrew David Ritzie, Delran, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 26, 1974, Ser. No. 536,559

Int. Cl.² G01S *9/24*

U.S. Cl. 343—14 **6 Claims**



1. In a continuous wave radar ranging system, wherein a signal is transmitted in the direction of a target and is reflected from said target back to the source of said transmitted signal, said transmitted signal being frequency modulated in accordance with a given periodic waveform, said ranging system including means for deriving from said transmitted signal and said reflected signal a difference signal indicative of the frequency difference of said reflected signal from the instantaneous frequency of said transmitted signal, a signal processor comprising:

a. blanking means, receptive of signals indicative of said modulation waveform, for generating a train of blanking pulses in synchronism with the extrema of said modulation waveform, said blanking pulses having a width at least as great as the duration of any phase reversal region in said difference signal;

b. zero crossing detector means, responsive to said blanking pulses and a signal indicative of a variable number and receptive of said difference signal for generating signals indicative of zero crossings in said difference signal occurring respectively a predetermined number and said variable number of zero crossings after each blanking pulse and said variable number being determined from the last range measurement of said target;

c. accumulator means, responsive to said predetermined and variable number zero crossing signals, for producing a signal indicative of the cumulative duration of the time periods between the respective occurrence of corresponding predetermined number zero crossings and variable number zero crossings occurring after each of a second predetermined number of blanking pulses;

d. conversion means, receptive of said duration signal, for deriving from said duration the range of said target and producing a signal indicative of said range; and

e. override condition detector means, responsive to said blanking pulses and said predetermined and variable number zero crossing signals, for resetting said accumulator means to zero, decreasing said variable number, and initiating a new determination of said cumulative duration when said variable number of zero crossings after any given blanking pulse encompass the next succeeding blanking pulse.

3,974,502

PHASE COMPARISON RADIO NAVIGATION SYSTEM RECEIVER HAVING PHASE MEMORY OSCILLATORS FOR PHASE LOCKING TO TIME-SEQUENTIALLY RECEIVED TRANSMISSIONS

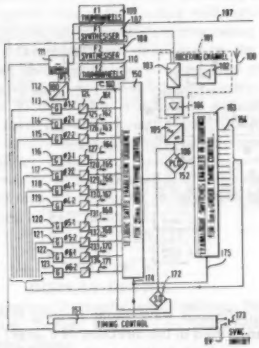
Derek John Phipps, London, England, assignor to Decca Limited, London, England

Filed Nov. 15, 1974, Ser. No. 524,200

Claims priority, application United Kingdom, Nov. 16, 1973, 53185/73

Int. Cl.² G01S *1/30*

U.S. Cl. 343—105 R **10 Claims**



1. A receiver for a phase comparison radio navigation system wherein there is provided a phase memory for giving a continuous output signal having a phase locked to the phase of a received radio frequency signal, which phase memory comprises a controllable oscillator at a frequency much greater than the radio frequency to be received, said oscillator being controllable in frequency in response to a control signal, a frequency synthesiser fed from said oscillator to provide a selected heterodyne frequency at a frequency which is a multiple of a first sub-multiple of the oscillator frequency, a frequency divider coupled to said oscillator to provide an output which is a second sub-multiple of the oscillator frequency, said second sub-multiple being another multiple of said first sub-multiple, a mixer arranged for mixing the heterodyne frequency from the synthesiser with the received signal to give an intermediate frequency signal, a phase comparator arranged for comparing the phase of the intermediate frequency signal with the phase of the divider output to provide said control signal and means applying said control signal to said oscillator as a frequency control to phase-lock the oscillator with respect to the received signal.

3,974,503

PHASE COMPARISON RADIO NAVIGATION SYSTEM WITH TIME-SEQUENCED TRANSMISSIONS FROM SPACED STATIONS USING SELECTABLE PHASE MEMORY OSCILLATORS IN A RECEIVER

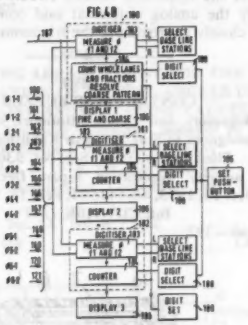
Derek John Phipps, London, England, assignor to Decca Limited, London, England

Filed Nov. 15, 1974, Ser. No. 524,198

Claims priority, application United Kingdom, Nov. 16, 1973, 53231/73

Int. Cl.² G01S *1/30*

U.S. Cl. 343—105 R **5 Claims**



2. In a radio navigation system in which radio signals of a given frequency are radiated in time-sequence from spaced transmitting stations with the radiated signals being locked to one another in phase; a receiver comprising means for receiving the radiated signals, a plurality of oscillators with one for each received signals, said oscillators operating at a frequency substantially greater than said given frequency, phase-lock means responsive to the received signals phase-locking the oscillators with their respective received signals, a plurality of frequency dividers connected respectively to the oscillators dividing the oscillator outputs in frequency to a comparison frequency lower than said given frequency, a frequency synthesiser locked to one of said oscillators and arranged to provide a heterodyne signal, mixer means connected to said synthesiser and said receiving means to change the frequency of the received signals to said comparison frequency, at least two display units with each having two inputs and including a counter-type phase comparator and decimal digital display for displaying the phase relationship between signals at said two inputs, and selector means arranged to connect outputs from selected dividers to said display unit inputs.

3,974,504

PEAK ACCELEROGRAPH

Paul D. Engdahl, 2850 Monterey Ave., Costa Mesa, Calif. 92626

Filed June 27, 1975, Ser. No. 591,136

Int. Cl.² G01D *15/02*

U.S. Cl. 346—7 **9 Claims**

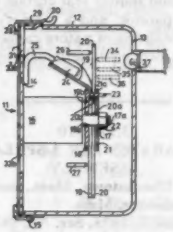
1. A peak accelerograph assembly comprising:

a base;

a seismic mass and a set of parallel flexures connecting it resiliently to said base to constrain it substantially to oscillatory motion only in translation;

a lever arm pivoted to said base and having a swingable connection to said mass and carrying a marking element adjacent its outer end; and

a record plate in marking relation with said element, a known linear displacement of said mass acting to swing



said arm to produce an arcuate mark on said plate of length greater than said displacement.

3,974,505

RECORDING DEVICE WITH PLURAL RECORDING DISCS WITH ONE DEFLECTED FOR IMPROVED VIEWING

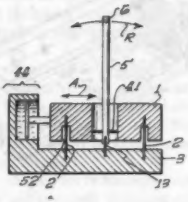
James George Arthur Rees, Bromley, England, assignor to C. L. Instruments Limited, England

Filed Nov. 13, 1974, Ser. No. 523,481

Claims priority, application United Kingdom, Nov. 21, 1973, 53905/73

Int. Cl.² G01D *9/06, 15/28*

U.S. Cl. 346—44 **24 Claims**



1. A recording device comprising a casing means for supporting a first record disc and a second record disc in substantially parallel, coaxial relationship, separate recording means for recording data on said first and second record discs respectively, means for rotating said record discs about their common axis means for deflecting part of said first record disc out of the plane of the undeflected part of said first record disc, and at least one view port provided in one wall of the casing whereby data recorded on both record discs can be viewed from a common direction.

3,974,506

SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES

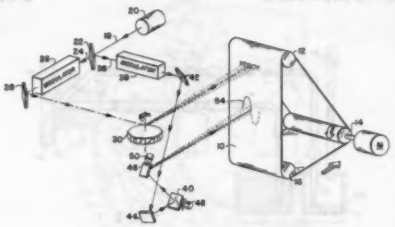
Gary Keith Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,638

Int. Cl.² G01D *9/28*

U.S. Cl. 346—45 **7 Claims**

1. A system for imaging characters and a graphic curve onto a recording medium comprising: a recording medium, a first beam of light, means for modulating said first beam, a rotatable polygon scanner located between said recording medium and said modulating means and in the path of said modulated first beam for scanning said first beam onto said recording medium and forming character images thereon, a second beam of light, means for modulating said second beam of light, first and second galvanometer operated mirrors, one of said mirrors being rotatable about a horizontal axis, the other of said mirrors being rotatable about a vertical axis, said first mirror being located between said modulating means for said second beam and said second mirror and in the path of said second beam, said first mirror reflecting said beam onto said



second mirror, said second mirror reflecting said beam onto said recording medium to form a graphic curve image thereon, said first and second beams striking said recording medium at vertically spaced locations, said recording medium being generally planar at least at the location that said beam strikes the same.

3,974,507

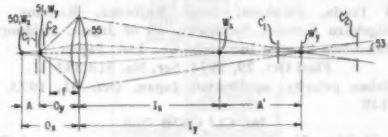
CONVERSION OF STRIPE-GEOMETRY JUNCTION LASER EMISSION TO A SPHERICAL WAVEFRONT

Robert Guido Chemelli, Morristown, and Richard Carrel Miller, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 29, 1975, Ser. No. 617,531

Int. Cl.² G01D *15/10, 9/42;* **H01S** *3/00;* **H04N** *1/00*

U.S. Cl. 346—76 L **11 Claims**



1. In combination in a compact micrographics system in which holes are machined in a thin film by means of a solid-state junction laser, a lens array adapted to be interposed between the output face of the laser and the thin film, the output beam of said laser viewed in a plane normal to the junction plane having a relatively large far-field divergence angle with an apparent source at said output face and the output beam of said laser viewed in a plane parallel to the junction plane having a relatively small far-field divergence angle with an apparent source in the laser behind said output face, said array comprising

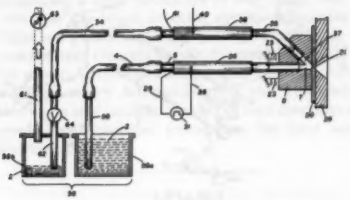
a spherical lens positioned to collect light emitted by said laser and to form spaced-apart real images of said sources, said lens having a numerical aperture sufficiently large to accommodate the maximum divergence exhibited by the output beam of said laser and to accommodate beam steering effects exhibited by said beam,

and lens means for collecting light formed by said spherical lens to cause light rays directed at said thin film to form a collimated beam having a circular cross-section.

3,974,508
AIR PURGING SYSTEM FOR A PULSED DROPLET EJECTING SYSTEM

John Blumenthal, Wickliffe, Ohio, assignor to Gould Inc., Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 532,865
Int. Cl.² G01D 15/18
U.S. Cl. 346—140 R 5 Claims

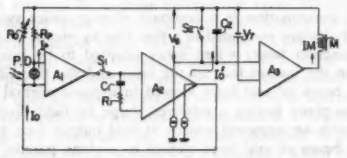


1. An air purging system for a pulsed droplet ejecting device comprising:
- a first conduit having a first end and a second end;
- a droplet ejecting orifice;
- means for coupling said orifice to said second end of said conduit;
- a second conduit having a first end and a second end;
- means for coupling the second ends of said first and second conduits together;
- means for temporarily causing liquid to flow into the first end of said first conduit, through said conduit into and through said second conduit and out said first end of said second conduit, with sufficient velocity to sweep out substantially all of the air from said system; and
- an electroacoustic transducer coupled to the liquid in one of said conduits and adapted, after termination of said temporary flow, to apply a pressure pulse to said liquid causing ejection of a droplet of liquid from said orifice.

3,974,509
AUTOMATIC EXPOSURE CONTROL CIRCUIT FOR A CAMERA

Yuji Tsuda, Hirakata; Junji Kajiwara, Kadoma, and Shigekazu Komori, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Oct. 29, 1974, Ser. No. 518,882
Claims priority, application Japan, Oct. 31, 1973, 48-123149
Int. Cl.² G03B 7/08
U.S. Cl. 354—51 1 Claim

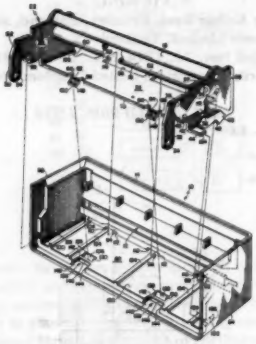


1. An automatic exposure control circuit for a camera having a shutter including a rear curtain comprising a photoelectric transducer element having a fast response to light for detecting the brightness of an object, an amplifier circuit for amplifying the output of said transducer element, a differential amplifier for amplifying the output of said amplifier, a store switch connected between the output of said amplifier and an input of said differential amplifier, a charging capacitor charged by an output of said differential amplifier for determining the speed of said shutter, a trigger switch connected in parallel with said charging capacitor, a comparator for detecting the output of said charging capacitor, an electromagnetic coil for controlling said shutter rear curtain in response to the output of said comparator, and a memory circuit having a series connection consisting of a store capacitor and a resistor connected between two input terminals of said differential amplifier.

3,974,510
MOUNTING APPARATUS FOR A SPREADER ROLLER ASSEMBLY

Andrew S. Ivester, Charlestown, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 2, 1975, Ser. No. 582,720
Int. Cl.² G03B 17/50
U.S. Cl. 354—86 16 Claims



1. A mounting apparatus for releasably retaining a pair of juxtaposed pressure-applying members at a predetermined location within a camera for progessively distributing a processing composition between predetermined layers of a film unit being advanced to the exterior of the camera, comprising:
- a bracket for mounting said pair of pressure-applying members in a predetermined relationship thereon including a substantially flat bottom member having forward and rearwardly facing edges and a pair of spaced upright members extending substantially perpendicular to said bottom member to form spaced outwardly facing opposing sides of said bracket;
- a housing section including a substantially flat base for underlying said bottom member of said bracket, a pair of spaced side members disposed substantially perpendicular to said base and spaced to form inwardly facing opposing end walls of said housing section to receive said opposing sides of said bracket therebetween, and a forward wall portion mutually integral with said base and said side members extending substantially perpendicular to said base transversely along one edge between said side members to form a leading end wall of said housing section;
- means for coupling said housing section to said bracket included along said forward and rearwardly facing edges of said bottom member and upon each said outwardly facing wall of said bracket; and
- means for cooperating with said coupling means included on said housing section for releasably retaining said bracket upon inner surfaces of said housing section in said predetermined location between said side members.

3,974,511

ELECTRICAL SWITCH ASSEMBLY

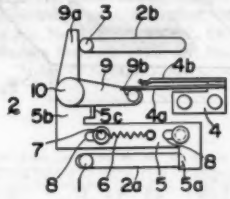
Toshiaki Matsumoto, Amagasaki, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 18, 1974, Ser. No. 533,751

Claims priority, application Japan, Dec. 31, 1973, 49-1334[U]

Int. Cl.² G03B 15/03

U.S. Cl. 354—147 4 Claims



1. A synchro-switch for use in a photographic camera of a type having leading and trailing shutter members constituting a plane shutter mechanism, said leading and trailing shutter members cooperating with each other to define an exposure opening through which each frame of a photosensitive film loaded in the camera is exposed to the incoming light carrying an image of an object to be photographed, said synchro-switch comprising:

a pair of contact members stationarily supported in position in spaced relation to each other;

first and second members respectively associated with said leading and trailing shutter members for movement together therewith;

a plate member supported in position for sliding movement between an inoperative and an operative position, said plate member being moved from said inoperative position to said operative position by said first member upon completion of movement of said first member from one position to another; and

a substantially L-shaped lever having a releasing arm and an actuating arm and pivotally mounted on said plate member, said L-shaped lever engaging said second member and pivoting, as said plate member is moved towards the operative position and if the trailing shutter member has not yet been moved in pursuit of said leading shutter member, to cause said actuating arm to press one of the contact members into contact with the other contact member to complete a circuit while said releasing arm is restrained by said second member associated with said trailing shutter member, and when said trailing shutter member is moved prior to the plate member being moved to the operative position, the second member moving out of the path of said L-shaped lever so that said L-shaped lever is not pivoted and said contact members are not pressed into contact.

3,974,512

ELECTRONIC CONTROL DEVICE FOR PHOTOGRAPHIC EXPOSURE FACTORS

Wilhelm Pross, Munich, Germany, assignor to Compur-Werk Gesellschaft mit beschrankter Haftung & Co., Munich, Germany

Filed Oct. 14, 1975, Ser. No. 621,827

Claims priority, application Germany, Oct. 15, 1974, 2449111

Int. Cl.² G03B 9/58

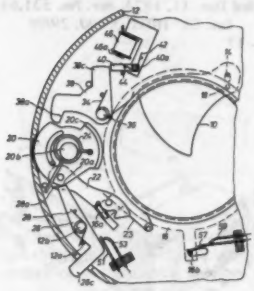
U.S. Cl. 354—226 5 Claims

1. An electronic control device for an exposure factor of a photographic camera, comprising:

a. a logarithmically graduated setting scale;

b. an electrically operated control element for controlling an exposure factor in response to a value set on said setting scale;

c. a potentiometer having a variable resistance value settable by setting said graduated setting scale, said potentiometer having a resistance values varying linearly; and



d. a logarithmizer having an input responsive to the set resistance value of said potentiometer and having an output operatively connected to said control element.

3,974,513

CAMERA ACCESSORY SECURING MEANS

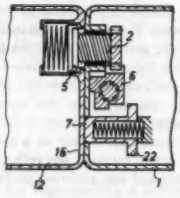
Heinz Waaske, Mascherode, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Nov. 20, 1974, Ser. No. 525,410

Claims priority, application Germany, Nov. 24, 1973, 2358576

Int. Cl.² G03B 11/00

U.S. Cl. 354—295 8 Claims



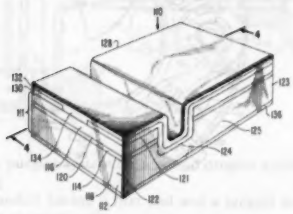
1. Securing means for securing an accessory element detachably to a photographic camera element, comprising bayonet-type locking means having a first part on one of said elements and a cooperating second part rotatably mounted on the other of said elements, said second part being rotatable from a disengaged position to an engaged position, spring means tending to rotate said second part from its disengaged position toward its engaged position, and releasable latching means for holding said second part in its disengaged position with said spring means tensioned, said first part comprising a rearwardly faced shoulder surrounding an aperture into which said second part may extend when said accessory element and said camera element are brought together in predetermined alignment with each other, and said second part comprising a rotary shank portion and a head portion so shaped that it may pass through said aperture freely when said shank portion is in a disengaged position of orientation, and may not pass through said aperture but will overlie and engage with said rearwardly faced shoulder of said first part when said shank portion is rotated to an engaged position of orientation.

3,974,514

ELECTROLUMINESCENT EDGE-EMITTING DIODE COMPRISING A LIGHT REFLECTOR IN A GROOVE

Henry Kressel, Elizabeth; Michael Ettenberg, Freehold, and Ivan Ladany, Stockton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,614
Int. Cl.² H01L *33/00, 29/06*
U.S. Cl. 357—17 5 Claims



1. An electroluminescent edge-emitting diode comprising:
a body of semiconductor material having a P-N junction, a light-emitting surface substantially perpendicular to the P-N junction, a surface opposite the emitting surface, a contacting surface parallel to the P-N junction, two sides which are substantially parallel to each other, substantially perpendicular to the P-N junction and emitting surface;
a single metal contact on a portion of the contacting surface spaced from the sides and adjacent the emitting surface, said contact extending from the emitting surface a distance no more than one-quarter the distance from the emitting surface to the opposite surface;
an insulating layer on the contacting surface except for that portion of the contacting surface on which is the metal contact; and
a groove in the contacting surface of the body, said groove extending across the body substantially parallel to the emitting surface and being adjacent the metal contact at a distance from the emitting surface equal to the distance the metal contact extends from the emitting surface, said groove being spaced from the opposite surface, said groove extending into the body a distance so as to cross the P-N junction, and means at a surface of the groove adjacent the metal contact for reflecting light generated in the body toward the emitting surface.

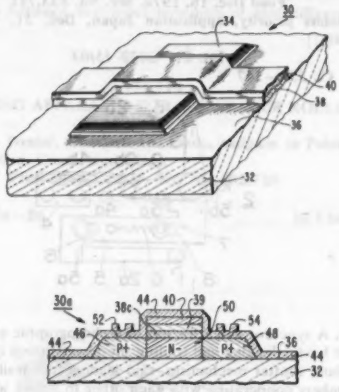
3,974,515

IGFET ON AN INSULATING SUBSTRATE

Alfred Charles Ipri, Belle Mead; Joseph Hurlong Scott, Plainsboro, and John Carl Sarace, Plainfield, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 12, 1974, Ser. No. 505,584
Int. Cl.² H01L *29/78, 27/12, 45/00, 29/06*
U.S. Cl. 357—23 9 Claims

1. An IGFET comprising:
an electrically insulating substrate having a surface,
an island of single-crystal silicon on a portion of said surface, having source and drain regions of one type conductivity at opposite ends thereof, respectively, and having a channel region of the opposite type conductivity intermediate said source and drain regions and adjacent to the surface of said island away from said substrate,
a dielectric layer over said channel region and continuous over said surface of said substrate on opposite sides of said channel region and extending away therefrom, said opposite sides being along the same direction as the flow of conductivity modifiers in said channel region, and
a gate electrode over said dielectric layer, said gate electrode extending beyond said channel region away from



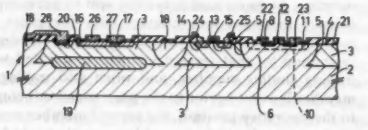
said opposite sides and being separated from said substrate by said dielectric layer.

3,974,516

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE HAVING AT LEAST ONE INSULATED GATE FIELD EFFECT TRANSISTOR, AND SEMICONDUCTOR DEVICE MANUFACTURED BY USING THE METHOD

Walter Steinmaier, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 367,945, June 7, 1973, abandoned, which is a division of Ser. No. 196,017, Nov. 5, 1971. This application Dec. 19, 1974, Ser. No. 534,204
Claims priority, application Netherlands, Nov. 21, 1970, 7017066
Int. Cl.² H01L *27/02*
U.S. Cl. 357—42 6 Claims



1. A semiconductor device including an insulated gate field effect transistor, comprising:
a. a semiconductor body comprising a major surface and having a first region of first conductivity type and a second region of second conductivity type located at said semiconductor surface, said second region being located adjacent to said first region so as to form therewith a p-n junction that terminates at said semiconductor surface and containing a zone of maximum second conductivity type doping impurity concentration, said second region comprising a positive doping concentration gradient between said maximum concentration zone and said semiconductor surface, and
b. source and drain zones of said transistor located completely in and surrounded in said body by the portion of said second region exhibiting said positive doping concentration gradient and a channel zone of said transistor located completely withing said positive doping gradient portion, whereby the concentration of said second impu-

rity type material in said positive doping gradient portion increases from said semiconductor surface toward said maximum concentration zone.

3,974,517

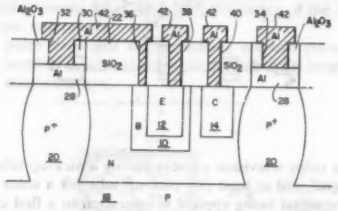
METALLIC GROUND GRID FOR INTEGRATED CIRCUITS

Thomas J. Sanders; Jacob A. Davis, both of Indialantic, and William R. Morcom, Indian Harbor Beach, all of Fla., assignors to Harris Corporation, Cleveland, Ohio

Continuation of Ser. No. 412,118, Nov. 2, 1973, abandoned. This application Mar. 25, 1975, Ser. No. 561,677

Int. Cl.² H01L *27/04*

U.S. Cl. 357—48 **4 Claims**



1. A semiconductor integrated circuit comprising:

a body of semiconductor material of a first conductivity type having a first planar surface;

a plurality of spaced apart planar regions adjacent said first surface, each of a second conductivity type, opposite said first conductivity type, said regions including semiconductive components;

isolation barriers of semiconductor material of said first conductivity type adjacent said first surface of said first conductivity type separating said planar regions;

a first continuous conductor deposited on a substantial portion of said isolation barriers and connected directly to a source of common potential;

a first homogenous insulation layer of a first material covering said first planar surface and the lateral edges of said first conductor and having a thickness greater than the thickness of said first conductor so as to define a second planar surface with a channel therein above said first conductor;

a second insulation layer of a second material in said channel covering said first conductor and having a thickness substantially equal to the thickness of said first insulation layer minus the thickness of said first conductor so as to complete said second planar surface; and

second conductors overlying said second planar surface and interconnecting said first conductor and selected planar areas of said semiconductor components through apertures in said first and second insulation layers.

3,974,518

ENCAPSULATION FOR HIGH FREQUENCY SEMICONDUCTOR DEVICE

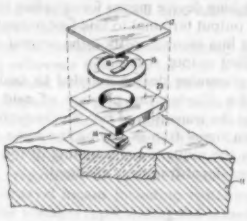
Basil Charles Lewis, Jr.; James Robert Mathews, and Louis Henry Von Ohlsen, Jr., all of Reading, Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 21, 1975, Ser. No. 551,991

Int. Cl.² H01L *39/02, 23/02*

U.S. Cl. 357—81 **3 Claims**

1. A semiconductor device suitable for high frequency applications in excess of about 10 GHz having an hermetic encapsulation including a metallic base member having high thermal and electrical conductivity, a diamond member embedded within said base member and having a substantially plane surface which is coplanar with a surface of said base member, a semiconductor diode chip mounted on said plane surface of said diamond member in electrical and thermal contact therewith, an annular insulating member surrounding



said chip and mounted entirely within the periphery of said diamond member and having a thickness substantially equal to the height of said chip, and a conductive cover member sealed to the upper surface of said insulating member.

3,974,519

APPARATUS FOR REPRODUCING A PAL COLOR TELEVISION SIGNAL WHICH IS RECORDED ON A RECORD CARRIER AND DROP OUT COMPENSATION

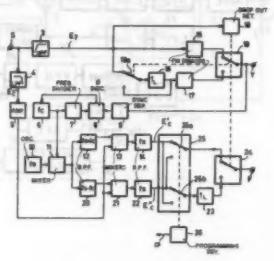
Willem van den Bussche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 28, 1974, Ser. No. 484,280

Claims priority, application Netherlands, July 17, 1973, 7309910

Int. Cl.² H04N *5/76*

U.S. Cl. 358—8 **5 Claims**



1. An apparatus for reproducing a color television signal which is recorded on a record medium and which comprises a first carrier, which is frequency-modulated by the luminance information, and a second carrier, which is modulated by the chrominance information in accordance with the PAL-standard and whose frequency lies between zero and the first-order lower side band of the modulated first carrier, said apparatus comprising

a first chrominance circuit including a first mixing circuit, said first mixing circuit having first input means for receiving the modulated second carrier read from the record carrier and a second input means for receiving a first mixing signal which has a frequency which equals the sum of the standard PAL chrominance carrier frequency and the second carrier frequency, and a first output terminal means for providing a first standard PAL-chrominance signal;

a second chrominance circuit including a second mixing circuit, said second mixing circuit having first input means for receiving the modulated signal second carrier read from the record carrier and a second input means for receiving a second mixing signal which has a frequency which equals the difference between the standard PAL

chrominance carrier frequency and the second carrier frequency, and a second output terminal means for providing a second standard PAL chrominance signal; a first output circuit;

a first switching device means for coupling in a first position the first output terminal to said first output circuit and for coupling in a second position the second output terminal to said first output circuit;

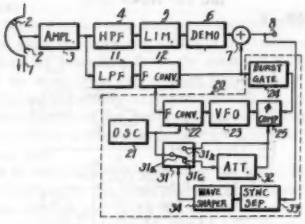
and a programming device coupled to said first switching device for altering the position of said first switching device at the transition of two successively read out color television signal frames having the same PAL-sequence, whereby the sequence of scanning of the recorded color television signal frames is changed.

3,974,520

CHROMINANCE SUBCARRIER PHASE CONTROL SYSTEM

Kunihiro Kuroyanagi, Chigasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1975, Ser. No. 571,002
Claims priority, application Japan, Apr. 23, 1974, 49-45735
Int. Cl.² H04N 9/44
U.S. Cl. 358—17 **9 Claims**



1. A color video signal processing system for correcting effects of angular errors in the subcarrier of the chrominance component of a color video signal, comprising:

A. frequency converting means receiving said chrominance component of the color video signal for frequency converting the chrominance subcarrier by means of a frequency converting signal applied to said frequency converting means; and

B. an automatic phase control loop circuit comprising:

1. a reference signal source for producing a reference signal,

2. a phase comparator for phase comparing the chrominance subcarrier with said reference signal and providing a control voltage in response to a deviation of said chrominance subcarrier from said reference signal,

3. means for producing said frequency converting signal including a variable frequency oscillator having its output phase controlled by said control voltge from said phase comparator, and

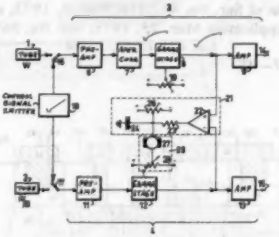
4. means for changing the gain of said loop circuit to one value for the vertical blanking interval and a different value for the vertical trace interval, respectively, of said color video signal.

3,974,521

CIRCUIT FOR AUTOMATIC GAMMA BALANCING

Hans-Dieter Schneider, Gross-Gerau, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 16, 1975, Ser. No. 613,868
Claims priority, application Germany, Sept. 28, 1974, 2446539
Int. Cl.² H04N 9/53
U.S. Cl. 358—32 **3 Claims**



1. In a color television camera having a pick-up tube for a white signal and at least one pick-up tube for a color signal, the white signal being applied in operation to a first channel including a first gamma correction stage and the at least one color signal being applied in operation to at least one second channel including a second gamma correction stage,

the improvement comprising a circuit for automatically balancing the gamma correction in the first and second channels comprising:

A. a control signal transmitter for generating an artificial picture test signal,

B. switch means operable while balancing the first and second channels for removing the pick-up tube signals from the first and second channels and for inserting the test signal in the first and second channels, the switch means operating at other times to insert the pick-up tube signals into their proper channels,

C. comparator means operable while balancing the first and second channels for comparing output signals from the first and second gamma correction stages to derive an error signal, and

D. means responsive to the error signal to adjust a gamma regulator in the second gamma correction stage to reduce the error signal,

whereby the gamma correction in the two channels is automatically balanced.

3,974,522

ELECTRONIC EDITING METHOD AND APPARATUS FOR A VIDEO TAPE RECORDER

Motonori Fukatsu, and Tatsumi Nakano, both of Tokyo, Japan, assignors to Akai Electric Company Limited, Tokyo, Japan

Continuation of Ser. No. 382,912, July 26, 1973, abandoned.
This application Apr. 4, 1975, Ser. No. 565,195
Int. Cl.² G11B 27/00
U.S. Cl. 360—14 **1 Claim**

1. Electronic editing circuitry for a video tape recorder to record a new video signal successively with respect to an old video signal prerecorded onto a magnetic tape without causing a disturbance of synchronism between the new and old video signals comprising:

means for reproducing control signals which were recorded on the magnetic tape coincidentally with the old prerecorded video signal,

means for comparing the respective phases of the control signals and reference signals associated with synchronizing signals forming a part of the new video signal,

means for controlling a servo system of the video tape recorder in response to the comparison in order to provide synchronism between the old and new video signals,

means for recording the new video signal on the tape only when the synchronism is accomplished,

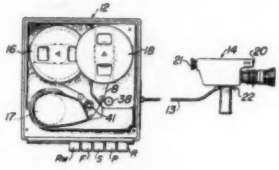
means for increasing the recording current of the new video signal for the time interval within which new and old signals overlap after commencement of the second recording operation in order to avoid a picture disturbance caused by the old video signal remaining unerased on the magnetic tape,

means for rewinding the magnetic tape by a predetermined length thereof immediately after the recording has been completed comprising a rewinding plunger,

means for preventing the recording of the new video signal from starting during a rewinding period of the magnetic tape and immediately upon completion of the rewinding period,

stopping means for stopping the rewinding of the magnetic tape, comprising:

a pulse generator for generating electric pulses whose number is in proportion to the rewound length of the magnetic tape,



a counter for counting the number of the electric pulses and deriving an output therefrom when the number reaches a predetermined value, and

a normally closed switch adapted to be opened by the output of the counter for deenergization of the rewinding plunger,

means for moving the magnetic tape in a forward direction,

means for delaying for a predetermined period the movement of the magnetic tape in a forward direction after the rewinding operation has been completed comprising:

a power source,

a winding plunger for actuating the means for moving the magnetic tape in a forward direction,

first switch means for connecting a terminal of the winding plunger to the power source when the rewinding operation has been completed,

second switch means adapted to connect the other terminal of the winding plunger to ground,

electrical delay means connected to the second switch means to maintain the second switch means open for a predetermined period after the first mentioned terminal of the winding plunger has been connected to the power source.

3,974,523

SPEED INVARIANT DECODING OF DIGITAL INFORMATION FROM A MAGNETIC TAPE

Leo S. Miller, and Freddie W. Wenninger, both of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

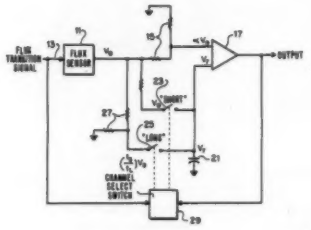
Filed Sept. 30, 1974, Ser. No. 510,852
Int. Cl.² G11B 5/09
U.S. Cl. 360—40 **1 Claim**

1. A device for speed invariant decoding of digital information stored on a magnetic tape as a continuous sequence of "short" and "long" distances between magnetic flux transitions on the tape, the distance between each flux transition and the next successive flux transition representing one bit of digital information, said device comprising:

means for moving the tape past a flux sensing mechanism;

sensing means for sensing a time interval between each flux transition and the next successive flux transition on the tape and converting the sensed time interval to a voltage representative thereof;

reference interval means for electronically deriving and updating a reference time interval from a number of the previously sensed time intervals so that the reference time interval will always be greater than sensed time intervals corresponding to "short" distances between successive flux transitions and less than sensed time intervals corresponding to "long" distances between successive flux transitions, regardless of variations in tape speed, said reference interval means including switching means for sampling the voltages representing the sensed time intervals through a first electrical channel when the sensed time interval is less than the reference time interval, and through a second electrical channel when the sensed time interval is greater than the reference time interval, each



of said first and second electrical channels including an associated voltage dividing network so that the voltage sensed through the second electrical channel is multiplied by a constant of proportionality equal to a nominal value of the ratio of a time interval corresponding to a "short" distance to a time interval corresponding to a "long" distance, said reference interval means further including a capacitive element interconnected with the sensing means through the first and second electrical channels, the capacitive element being thereby electrically charged by the voltage outputs of said first and second electrical channels to a reference voltage representative of the reference time interval; and

decoder means for comparing the sensed time interval with the reference time interval by comparing a multiple of the voltage representative of the sensed time interval with the voltage representative of the reference time interval, and decoding the sensed time interval as a "long" distance or a "short" distance if a multiple of the voltage representative of the sensed time interval is greater than or less than the voltage representative of the reference time interval respectively.

3,974,524

MAGNETIC STORAGE APPARATUS EMPLOYING FLEXIBLE RECORD DISKS WITH PERIPHERAL DISK-IDENTIFICATION MEANS

Donald E. Griffiths, Boulder County, and Carl F. Pugliese, Adams County, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

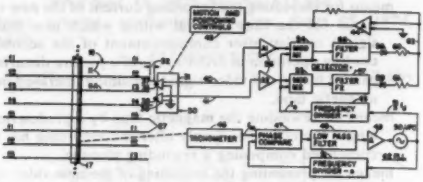
Filed Apr. 14, 1975, Ser. No. 568,075
Int. Cl.[2] G11B 21/02, 5/012, 5/016
U.S. Cl. 360—75 9 Claims

1. A flexible record disk type record apparatus having a coaxial stack of commonly rotatable flexible record disks,

the improvement including in combination:

a track having given recorded disk identifying magnetically sensible signals including a recorded given wavelength component on each of said disks in immediate juxtaposition to the outer peripheral edge thereof; and

a magnetic sensing apparatus disposed in immediate proximity of and spaced radially outwardly a distance other than said given recorded wavelength of said given wavelength component in said track, from the outer periphery of said disks and having a transducing gap facing said



edge for sensing said given recorded disk identifying signals for identifying axial position of the magnetic sensing apparatus.

DESIGN PATENTS

GRANTED AUGUST 10, 1976

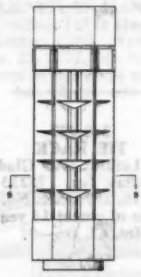
ERRATA

For CLASS	See PATENT NO.
025–074	240,915
016–039	240,964
016–030	240,965

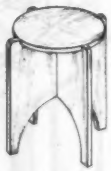
DESIGNS

AUGUST 10, 1976

240,870
DISPLAY STAND
Fred Howard, New York, and Roger G. Ferriter, Yonkers, N.Y., assignors to Hanes Corporation, Winston-Salem, N.C.
Filed May 12, 1975, Ser. No. 576,619
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—24

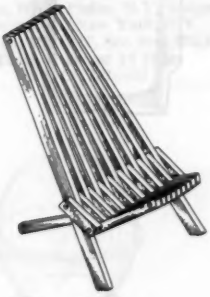


240,871
STOOL OR SIMILAR ARTICLE
Robert Herman, 3246 Baker St., San Francisco, Calif. 94123
Filed Sept. 3, 1974, Ser. No. 502,309
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32



240,872
SPINDLE-BACK CHAIR
Leonard Eisen, 14 Lomas Lane, Montvale, N.J. 07645
Filed July 23, 1974, Ser. No. 491,123
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—74

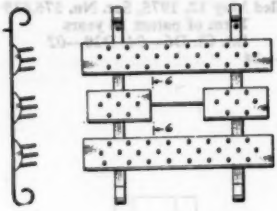
240,873
FOLDING CHAIR
Robert D. Lewis, 1121 Aberdeen, Apt. A, Harvey, La. 70058, and Daniel G. Goss, 2313 Hero Drive, Gretna, La. 70053
Filed Dec. 30, 1974, Ser. No. 537,545
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—76



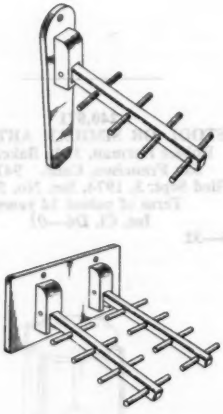
240,874
CHAIR
Thomas Lamb, 349 Wellesley St., Toronto 5, Ontario, Canada
Filed June 23, 1972, Ser. No. 265,826
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—78

240,875
SOAP DISH HOLDER
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Original design application Dec. 26, 1973, Ser. No. 428,363, now Patent No. 235,616, dated July 1, 1975. Divided and this application Apr. 7, 1975, Ser. No. 565,791
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—90

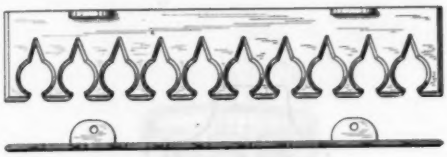
240,876
RACK FOR SEWING ACCESSORIES OR THE LIKE
James F. Learing, Mira Loma, Calif. (6205 Camino Manzano, Anaheim, Calif. 92807)
Filed Jan. 27, 1975, Ser. No. 544,068
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



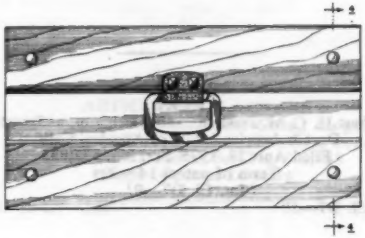
240,877
TIE RACK
Lawrence M. Lefkof, 2509 Gladiolus Lane, Dallas, Tex. 75233
Filed Feb. 18, 1975, Ser. No. 550,775
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—117



240,878
PRE-KNOTTED NECKTIE RACK
Salvatore J. Rock, 1809 Brickell Ave., Apt. 417, Miami, Fla. 33129
Filed Aug. 25, 1975, Ser. No. 607,148
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—118



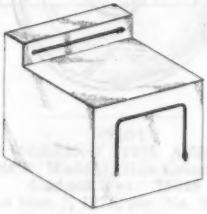
240,879
FURNITURE PANEL
David T. Kline, 16522 Hartsook St., Encino, Calif. 91436
Filed Apr. 22, 1975, Ser. No. 570,858
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192



240,880
GAME TABLE BASE
James C. Phillips, Redondo Beach, Calif. (Worldway, P.O. Box 90105, Los Angeles, Calif. 90009)
Filed June 3, 1974, Ser. No. 475,552
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194

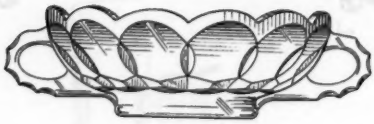
240,881
CLOTHES HANGER
William L. Niclaus, Parsippany, N.J. (170 Knoll Road, Boonton, N.J. 07005)
Filed May 27, 1975, Ser. No. 580,729
Term of patent 3½ years
Int. Cl. D6—*08*
U.S. Cl. D6—255

240,882
COVER FOR A DOMESTIC APPLIANCE
Annette E. Knight, 10238 Burman, Houston, Tex. 77029
Filed July 25, 1974, Ser. No. 487,205
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—269

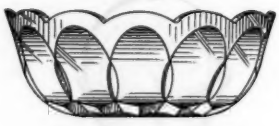


240,883
CHEESE SERVER
Fred Press, White Plains, N.Y., assignor to Styson, Inc., New York, N.Y.
Filed Feb. 18, 1975, Ser. No. 550,649
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17

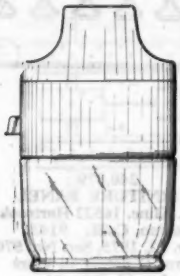
240,884
DISH OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Original design application Sept. 13, 1973, Ser. No. 397,069. Divided and this application Feb. 10, 1975, Ser. No. 548,599
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—20



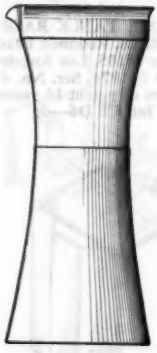
240,885
BOWL OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Original design application Sept. 13, 1973, Ser. No. 397,069. Divided and this application Jan. 24, 1975, Ser. No. 543,698
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—28



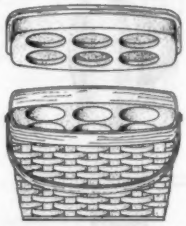
240,886
COMBINED JUICE EXTRACTOR AND STORAGE CONTAINER
Murray Jay, Woodsburgh, N.Y., assignor to Gemco-Ware Inc., Freeport, N.Y.
Filed July 29, 1974, Ser. No. 492,883
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—49



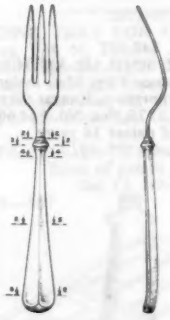
240,887
CRUET
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Apr. 28, 1975, Ser. No. 572,033
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—59



240,888
BASKET COOLER
Thomas S. Roussel, 327 Court St.,
Keene, N.H. 03431
Filed Mar. 31, 1975, Ser. No. 563,859
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D7—77



240,889
ARTICLE OF FLATWARE
Ronald A. Guodace, Yalesville, Conn., assignor to
International Silver Company, Meriden, Conn.
Filed Apr. 25, 1975, Ser. No. 571,683
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



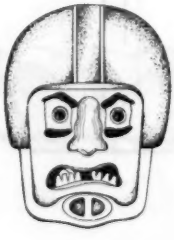
240,890
TOOL FOR REMOVING SPIN-ON OIL FILTERS
William H. Loflin, 208 S. Olive St.,
Kermit, Tex. 79754
Continuation-in-part of abandoned design application Ser. No. 373,644, June 26, 1973. This application Sept. 8, 1975, Ser. No. 611,183
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29

240,891
LEATHER WORKING TOOL ARRANGEMENT
David R. Waddell, 1310 Green Cove,
Garland, Tex. 75040
Filed Mar. 7, 1975, Ser. No. 556,339
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

240,892
WALL SWITCH COVER
John D. Birdsall, 1262 Sunset Plaza Drive, Los Angeles, Calif. 90069
Filed May 30, 1975, Ser. No. 582,219
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D8—183

240,893
WALL SWITCH COVER
John D. Birdsall, 1262 Sunset Plaza Drive, Los Angeles, Calif. 90069
Filed May 30, 1975, Ser. No. 582,342
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D8—183

240,894
WALL SWITCH COVER
John D. Birdsall, 1262 Sunset Plaza Drive, Los Angeles, Calif. 90069
Filed May 30, 1975, Ser. No. 582,292
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D8—183



240,895
PULLEY OR SIMILAR ARTICLE
Richard Lawrence Werner, 561 Richmond Drive, Sharon, Pa. 16146; Frank Michael McCarthy, 1438 S. 6th St., Saint Charles, Ill. 60174; and Arthur Wilson Runkel, R.D. #3, Cochranton, Pa. 16314
Filed Aug. 11, 1975, Ser. No. 603,263
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D8—216

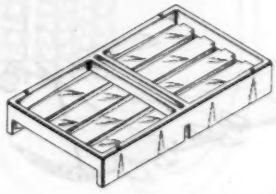
240,896
SUPPORT BRACKET FOR A STAIRCASE TREAD
Donald Leslie Ward, 58 Burnham Road, Leigh-on-Sea, Essex, England
Filed Nov. 18, 1974, Ser. No. 524,447
Claims priority, application Great Britain May 22, 1974, Aug. 14, 1974
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—235

240,897
BOTTLE OR SIMILAR ARTICLE
John W. McDonald, Kansas City, Mo., assignor to Ethyl Development Corporation, Kansas City, Mo.
Filed Mar. 3, 1975, Ser. No. 554,602
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—87

240,898
BOTTLE
Raymond G. Reynolds, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed June 17, 1974, Ser. No. 479,817
Term of patent 14 years
The term of this patent subsequent to May 25, 1990, has been disclaimed
Int. Cl. D9—*01*
U.S. Cl. D9—119

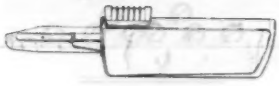
240,899
JAR
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.
Filed Feb. 18, 1975, Ser. No. 550,429
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—125

240,900
PACKAGING TRAY FOR FOOD OR THE LIKE
Gail Rogers, 538 N. Louise, Apt. 5, Glendale Calif. 91206; Billy Spiedel, 11137 Densmore Ave., Granada Hills, Calif. 91345; Edward Brisken, 2213 El Baile Place, Hacienda Heights, Calif. 91745; and Peter Rodgers, 12424 Texas Ave., Apt. 1, Los Angeles, Calif. 90025
Filed Feb. 20, 1975, Ser. No. 551,473
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—187

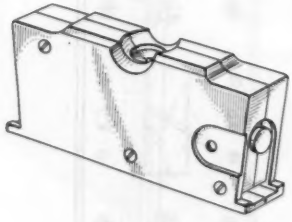


240,901
COMBINED DISPLAY CARD AND ARTICLE HOLDER
Henry M. Unger, 565 Solingen Walter-Dodde-Strasse 16, (or P.O. Box 100102), Solingen, Germany
Filed Jan. 15, 1975, Ser. No. 541,238
Claims priority, application Germany Sept. 24, 1974
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—191

240,902
RAZOR BLADE DISPENSER
David S. Byrne, Atlantic Highlands, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Feb. 18, 1975, Ser. No. 550,698
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224

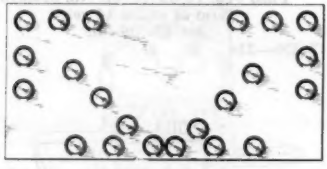


240,903
TAPE MEASURE CASE
Andrew J. Banas, Sr., 2647 23rd Ave., San Francisco, Calif. 94116
Filed Feb. 18, 1975, Ser. No. 550,889
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—72

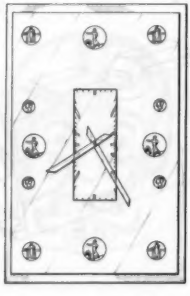


240,904
AUTOMOBILE TROUBLE FLASHER
Theodor Box, 1108 Aileen Road,
Brielle, N.J. 08730
Filed Oct. 17, 1974, Ser. No. 515,538
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—114

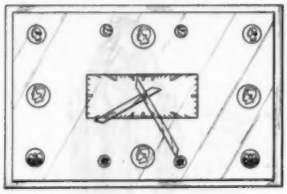
240,905
SIGNAL LIGHT SIGN PANEL
William L. Bruner, London, Ky., assignor to
F. B. Electronics
Filed July 9, 1974, Ser. No. 487,206
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—114



240,906
COMBINED CLOCK FACE AND HANDS
Byron C. Bennett, 1111 W. 11th St.,
Plainview, Tex. 79072
Filed June 20, 1975, Ser. No. 588,639
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—125

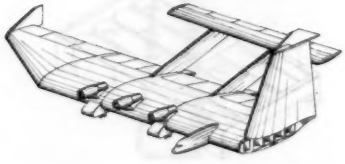


240,907
COMBINED CLOCK FACE AND HANDS
Byron C. Bennett, 1111 W. 11th St.,
Plainview, Tex. 79072
Filed June 20, 1975, Ser. No. 588,666
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—125

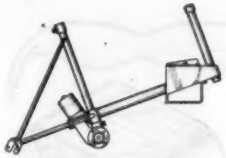


240,908
WATCHFACE
Victor P. Nozdrea, 69—44 Olcott St.,
Forest Hills, N.Y. 11375
Original design application Aug. 15, 1974, Ser. No. 497,633. Divided and this application June 13, 1975, Ser. No. 587,321
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126

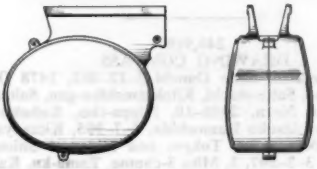
240,909
AIRPLANE
Philip C. Whitener, Seattle, Wash., assignor to
The Boeing Company, Seattle, Wash.
Filed Nov. 29, 1974, Ser. No. 528,172
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—76



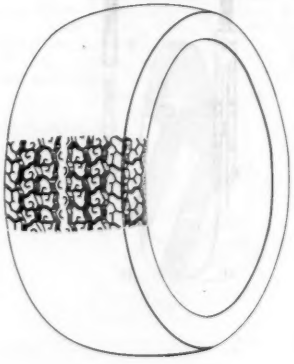
240,910
BICYCLE FRAME
Charles Patrick Duncan Davidson, Droitwich, England, assignor to Joseph Lucas Limited, Birmingham, England
Filed July 15, 1975, Ser. No. 596,206
Claims priority, application Great Britain Jan. 18, 1975
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



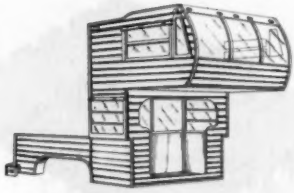
240,911
AIR BOX FOR BICYCLES
Roy R. Vachon, Rolling Hills, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Filed Jan. 15, 1975, Ser. No. 541,314
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



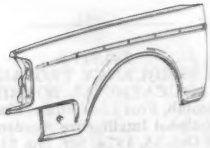
240,912
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Agawam, Mass., assignor to Uniroyal, Inc.
Filed Mar. 10, 1975, Ser. No. 556,838
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



240,913
CAMPER UNIT FOR PICKUP TRUCKS
Donald D. Coffman, 5921 Holland Road, Rockville, Md. 20851
Continuation-in-part of abandoned design application Ser. No 545,186, Jan. 29, 1975. This application July 7, 1975, Ser. No. 593,499
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156

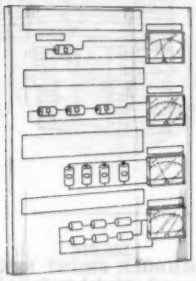


240,914
AUTOMOBILE FRONT FENDER
Jan Einar Wilsgaard, Torslanda, Sweden, assignor to AB Volvo, Gothenburg, Sweden
Filed Dec. 20, 1974, Ser. No. 535,115
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—184

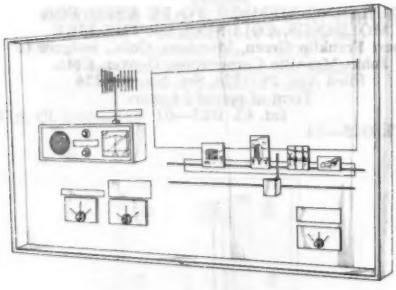


240,915
BUILDING MEMBER TO BE USED FOR MOLDINGS, COLUMNS, OR THE LIKE
Robert Franklin Green, Morrison, Colo., assignor to Johns-Manville Corporation, Denver, Colo.
Filed Apr. 29, 1974, Ser. No. 465,226
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

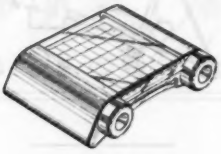
240,916
VOLTAGE EDUCATIONAL BOARD
Jack N. Holcomb, Fort Lauderdale, Fla., assignor to National Intelligence Academy
Filed Oct. 15, 1974, Ser. No. 514,904
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



240,917
RADIO FREQUENCY PROPAGATION EDUCATIONAL BOARD
Jack N. Holcomb, Fort Lauderdale, Fla., assignor to National Intelligence Academy
Filed Oct. 15, 1974, Ser. No. 514,903
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



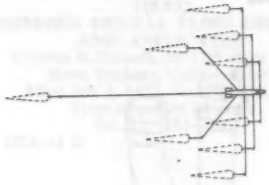
240,918
ROLL CALENDAR CASING FOR A WATCHBAND
Nils Jorgen Tvengsberg, Kringsjavelen 25, N–1415 Oppegaard, Norway
Filed Nov. 7, 1973, Ser. No. 413,707
Term of patent 14 years
Int. Cl. D19—*03*
U.S. Cl. D19—20



240,919
DRAWING COMPASS
Seisho Yamaguchi, Satte Danchi 3–12–402, 1478 Oaza Kamitakano, Satte-machi, Kitakatsushika-gun, Saitama-ken; Fujiro Nezu, 2040–10, Nippa-cho, Kohoku-ku, Yokohama; Atsuko Kamoshida, 5–7–905, Kitaaoyama 3-chome, Minato-ku, Tokyo; and Hidenori Shimizu, Nishimata 3–3–507, 2, Mita 3-chome, Tama-ku, Kawasaki, all of Japan
Filed June 26, 1974, Ser. No. 483,381
Claims priority, application Japan Feb. 1, 1974
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—38

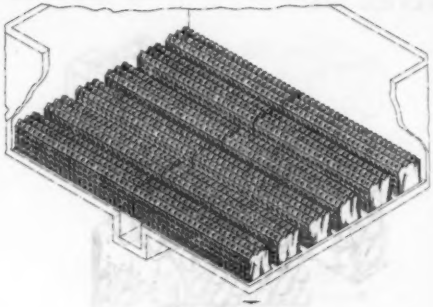
240,920
FISHING LURE
Jack A. Smithwick, P.O. Box 1205, Shreveport, La. 71163
Filed May 23, 1975, Ser. No. 560,345
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

240,921
FISHING LURE
Van L. Taylor, 932 Mountain Drive, Fultondale, Ala. 35068
Filed July 31, 1975, Ser. No. 600,834
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



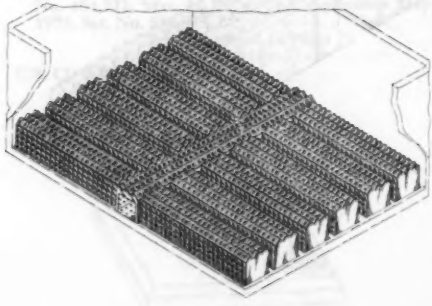
240,922
FISH LURE
James D. Maxwell, P.O. Box 649, Vancouver, Wash. 98660
Filed Nov. 3, 1975, Ser. No. 628,567
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—29

240,923
UNDERDRAIN FOR WATER FILTRATION SYSTEM
James Raymond Sturgill, Charlotte, N.C., assignor to Hi-Ran Ltd.
Filed Apr. 7, 1975, Ser. No. 565,690
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

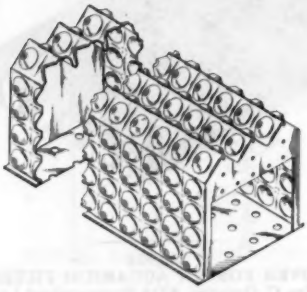


240,924
COVER FOR AN AQUARIUM FILTER
Vivian C. Orensten, 8724 Westmoreland Lane, St. Louis Park, Minneapolis, Minn. 55426
Filed Sept. 15, 1975, Ser. No. 613,329
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

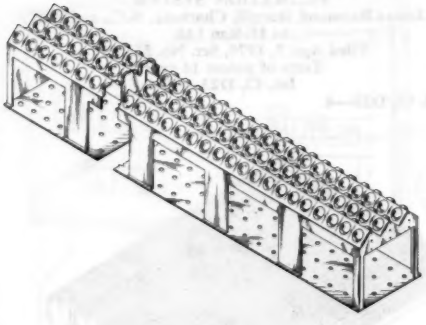
240,925
UNDERDRAIN FOR WATER FILTRATION SYSTEM
James Raymond Sturgill, Charlotte, N.C., assignor to Hi-Ran Ltd.
Filed Apr. 7, 1975, Ser. No. 565,689
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



240,926
UNDERDRAIN UNIT FOR WATER FILTRATION SYSTEM
James Raymond Sturgill, Charlotte, N.C., assignor to Hi-Ran Ltd.
Filed Mar. 3, 1975, Ser. No. 554,406
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

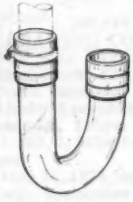


240,927
UNDERDRAIN UNIT FOR WATER FILTRATION SYSTEM
James Raymond Sturgill, Charlotte, N.C., assignor to Hi-Ran Ltd.
Filed Mar. 3, 1975, Ser. No. 554,396
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

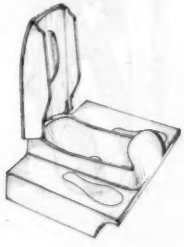


240,928
TREE SAP COLLECTING SPIGOT
Clement Metivier and Jean-Marie Chabot, St. Damien, Bellechasse County, Quebec, Canada, assignors to Les Industries Provinciales Limitee, St. Damien, Bellechasse County, Quebec, Canada
Filed May 30, 1975, Ser. No. 582,395
Term of patent 14 years
Int. Cl. D9—*02*; D23—*99*
U.S. Cl. D23—32

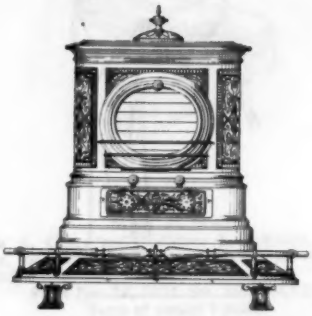
240,929
TRAP
John C. McIlroy, 906 Baldwin, Lapeer, Mich. 48446
Filed Feb. 25, 1975, Ser. No. 552,740
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—46



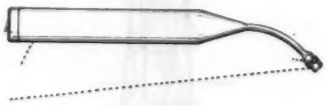
240,930
WATER CLOSET
Bjorn R. Kristoffersen, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Sept. 18, 1975, Ser. No. 614,572
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—67



240,931
HEATING STOVE
Gerrit Jan Faber, Leeuwarden, Netherlands, assignor to Faber B.V., Leeuwarden, Netherlands
Filed Apr. 24, 1975, Ser. No. 571,240
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—105

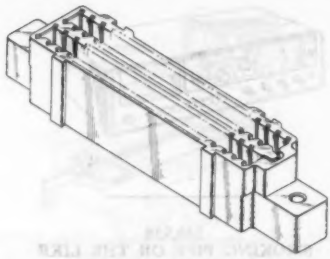


240,932
COMBINED DENTAL FLOSS DISPENSER AND APPLICATOR
Charles R. Russell, 3071 Marilyn Way, Santa Barbara, Calif. 93105
Filed Jan. 2, 1975, Ser. No. 538,471
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D24—1 D

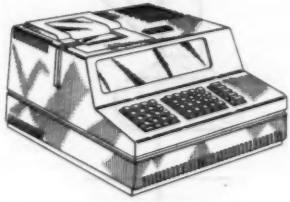


240,933
OPEN BARREL ALUMINUM CABLE CONNECTOR
Timothy Allen Lemke, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Original design application Sept. 14, 1973, Ser. No. 397,542, now Patent No. 237,189. Divided and this application Jan. 30, 1975, Ser. No. 545,673
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A

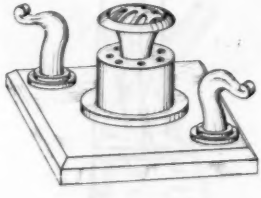
240,934
MODULAR SELF-COMMONING BARRIER BLOCK
Guy Vernon Harkins, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Apr. 22, 1975, Ser. No. 570,930
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



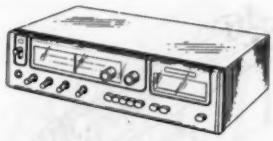
240,935
COMMERCIAL TELLER TERMINAL OR SIMILAR ARTICLE
William L. King, Dayton, and Thomas L. Hermann, Springfield, Ohio, assignors to NCR Corporation
Filed Dec. 23, 1974, Ser. No. 535,923
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D26—5 C



240,936
HOUSING FOR AN ELECTRO-MECHANICAL TRANSDUCER
Jerry O'Brien, 33 Pamrapo Ave., Jersey City, N.J. 07305
Continuation-in-part of abandoned design application Ser. No. 454,222, Mar. 25, 1974. This application May 27, 1975, Ser. No. 580,815
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



240,937
COMBINED AMPLIFIER, TUNER AND TAPE PLAYER
Katsuya Matsumura, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed Oct. 3, 1974, Ser. No. 511,605
Claims priority, application Japan Apr. 5, 1974
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D26—14 L



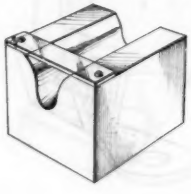
240,938
SMOKING PIPE OR THE LIKE
Richard W. Kahler, Rte. 1, Box 61, Rock Cave, W. Va. 26234
Filed Apr. 3, 1974, Ser. No. 457,413
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

240,939
HIPPOPOTAMUS PUPPET
Juanita A. Casey and Kathleen L. Johnson, Del City, Okla. (both of 7055 Lennox, Apt. 5, Van Nuys, Calif. 91405)
Filed Jan. 28, 1975, Ser. No. 544,927
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

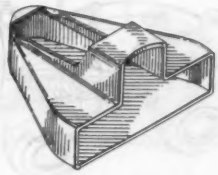
240,940
SERPENT PUPPET
Juanita A. Casey and Kathleen L. Johnson, Del City, Okla. (both of 7055 Lennox, Apt. 5, Van Nuys, Calif. 91405)
Filed Jan. 28, 1975, Ser. No. 544,928
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

240,941
ELEPHANT PUPPET
Juanita A. Casey and Kathleen L. Johnson, Del City, Okla. (both of 7055 Lennox, Apt. 5, Van Nuys, Calif. 91405)
Filed Jan. 28, 1975, Ser. No. 544,930
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

240,942
HOLDER FOR POOL AND BILLIARD CUES
Russell G. Gardner, 2645 Valley Ave., Winchester, Va. 22601
Filed Feb. 7, 1975, Ser. No. 548,069
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—3

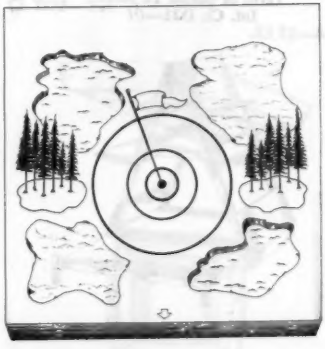


240,943
BALL RACK CARRIER FOR POOL TABLES
Jacob Kremski, Pine Hall Farm, 10440 S. State Road, Goodrich, Mich. 48438
Filed Mar. 14, 1975, Ser. No. 558,364
Term of patent 14 years
Int. Cl. D21
U.S. Cl. D34—3

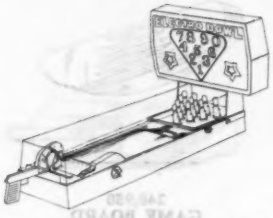


240,944
MAN PUPPET
Juanita A. Casey and Kathleen L. Johnson, Del City, Okla. (both of 7055 Lennox, Apt. 5, Van Nuys, Calif. 91405)
Filed Jan. 28, 1975, Ser. No. 544,929
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

240,945
DARTBOARD
Monte Gene Norton, Madison, Ala. (1915 Burks St., Petersburg, Va. 23803)
Filed Sept. 20, 1972, Ser. No. 291,638
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



240,946
BOWLING GAME CABINET
James R. Livesey, Hawthorne, Calif., assignor to Wolverine Toy Co., Booneville, Ark.
Filed Oct. 16, 1974, Ser. No. 515,144
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 BB

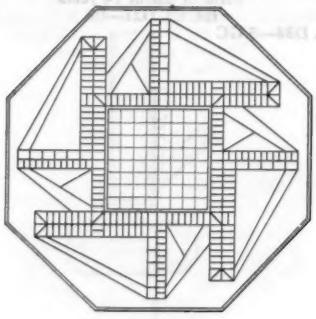


240,947
GOLF CLUB OR SIMILAR ARTICLE
William R. Pomper, 207 Woodland, Highland Park, Ill. 60035
Filed Oct. 26, 1973, Ser. No. 409,799
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC

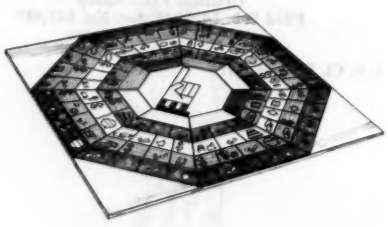
240,948
GOLF CLUB HEAD
Joseph F. Redoutey, 4305 Quando Lane, Orlando, Fla. 32809
Filed Feb. 14, 1975, Ser. No. 549,987
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

240,949
GOLF CLUB HEAD FOR PUTTING AND CHIPPING
Alonzo L. Jones, 6 Lawrence Ave., West Orange, N.J. 07052
Filed Dec. 20, 1974, Ser. No. 534,689
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

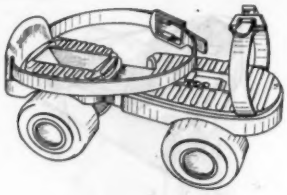
240,950
GAME BOARD
Lee O. Dykes, Jr., and Lillian H. Dykes, both of 9021 Gaylord, # 91, Houston, Tex. 77024
Filed Sept. 16, 1974, Ser. No. 506,282
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



240,951
GAME BOARD
Robert D. St. Cyr and Jay O. Such, Leominster, and Richard C. Adams, Hudson, Mass. (all of 54 Washington St., Leominster, Mass. 01453)
Filed Oct. 15, 1974, Ser. No. 514,770
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



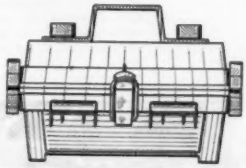
240,952
ROLLER SKATE
John A. Roche, Morrison, Mo., assignor to Steven Manufacturing Company, Hermann, Mo.
Filed Nov. 6, 1974, Ser. No. 521,288
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 C



240,953
TOY CONSTRUCTION PIECE
Ole Simonsen, Odense, Ib C. Clausen, Ringe, and Johannes Jensen, Odense, Denmark, assignors to Creaco A/S, Odense, Denmark
Filed Apr. 8, 1974, Ser. No. 459,176
Claims priority, application Denmark Oct. 9, 1973
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

240,954
DOLL HOUSE
Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91345, Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316, and Delmar K. Everitt, Woodland Hills, Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, Calif.; said Everitt, Chesley, and Frierdich assignors to said Goldfarb and Benkoe
Filed Feb. 10, 1975, Ser. No. 548,696
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL

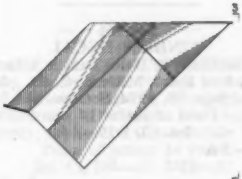
240,955
TOY TOOL BOX
Michael I. Satten, 245—20 Grand Central Parkway, Bellerose, N.Y. 11362
Filed Jan. 23, 1975, Ser. No. 543,358
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R



240,956
PLANTER
Dale F. Holmes, Fullerton, Calif., assignor to Continental Equipment Corporation, Fullerton, Calif.
Filed May 27, 1975, Ser. No. 581,365
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3 A

240,957
FLOWER POT BASE
Frederick A. Burke, Riverside, Conn., Joel A. Farrell, Carlisle, Mass., and Douglas A. Long, Wilton, Conn., assignors to The Gillette Company, Boston, Mass.
Filed Aug. 13, 1975, Ser. No. 604,104
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3 A

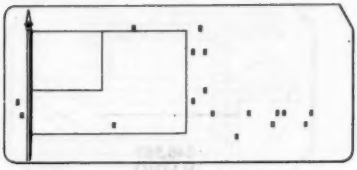
240,958
FRUIT LOADING HOPPER FOR A HARVESTING MACHINE
Dietrich G. Rempel, Akron, Ohio, assignor to Rempel Enterprises, Inc., Akron, Ohio
Filed Feb. 3, 1975, Ser. No. 546,438
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D40—1 R



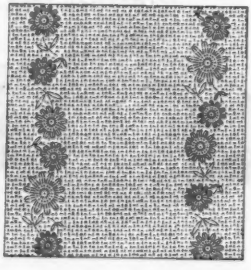
240,959
RADIO
Shogo Imai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed June 24, 1974, Ser. No. 481,951
Claims priority, application Japan Dec. 27, 1973
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

240,960
WINDOW DECAL
Thomas W. Hotchkiss, % Delta Design Associates, 310–B Boston Post Road, Milford, Conn. 06460
Filed Sept. 30, 1974, Ser. No. 510,734
Term of patent 14 years
Int. Cl. D19—*08*
U.S. Cl. D59—2 A

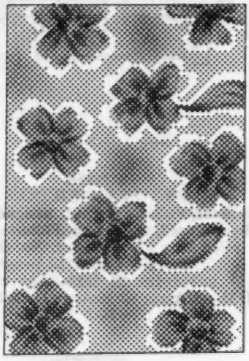
240,961
WINDOW DECAL
Thomas W. Hotchkiss, % Delta Design Associates, 310–B Boston Post Road, Milford, Conn. 06460
Filed Sept. 30, 1974, Ser. No. 510,762
Term of patent 14 years
Int. Cl. D19—*08*
U.S. Cl. D59—2 A



240,962
SHEET OF PAPER TOWELING
Ikki Matsumoto, Loveland, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed July 10, 1974, Ser. No. 487,335
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D59—2 B

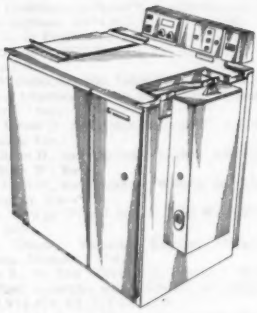


240,963
SHEET OF PAPER TOWELING
K. Clark Pester, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Mar. 7, 1974, Ser. No. 448,932
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D59—2 B

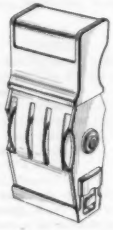


240,964
LIGHT METER
Charles A. Melvin, Danvers, Mass., assignor to General Electric Company, Schenectady, N.Y.
Filed Feb. 24, 1975, Ser. No. 552,390
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D16—39

240,965
COIN OPERATED REPRODUCTION MACHINE
Claude H. Hutcheson, Jr., Fairport, and Larry H. Warren, East Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Mar. 28, 1974, Ser. No. 455,850
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—30



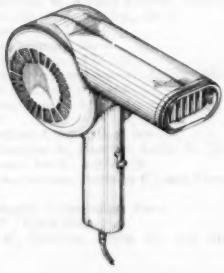
240,966
ROTARY STAMP
Takaji Funahashi, 1, 2-chome, Kitatakasho-machi, Nishi-ku, Nagoya-shi, Aichi-ken, Japan
Filed Mar. 31, 1975, Ser. No. 563,356
Claims priority, application Japan Oct. 17, 1974
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10



240,967
ACCOUNTING MACHINE
Ettore Sottsass, Jr., Milan, Italy, assignor to Ing. C. Olivetti & Co., S.p.A., Ivrea, Torino, Italy
Filed Mar. 12, 1975, Ser. No. 557,739
Claims priority, application Italy Sept. 18, 1974
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

240,968
INFANT FEEDING BOTTLE
Arthur Hurst, Golant, near Fowey, Cornwall, England, assignor to Adonsell Limited, Birmingham, England
Filed Apr. 3, 1975, Ser. No. 564,839
Claims priority, application Great Britain Nov. 19, 1974
Term of patent 14 years
Int. Cl. D9—*01*; D28—*01*
U.S. Cl. D83—8 A

240,969
PORTABLE HAIR DRYER
Dale E. Fahnstrom, Riverside, and Robert D. Peterson, Chicago, Ill., assignors to The Gillette Company, Boston, Mass.
Filed Sept. 3, 1974, Ser. No. 502,353
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF AUGUST, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See—*
Emmett, Lionel C. R., 3,973,560.

AB Lectrostatic: *See—*
Alskog, A. Magnus, 3,973,932.

Abbott Laboratories: *See—*
Geiszler, Adolph Oscar, 3,974,279.

Abbott, Roy W., to General Electric Company. Air conditioning system for mobile home. 3,973,939, Cl. 62-237.000.

Abdalla, Nabil Ahmed: *See—*
Poolman, Petrus Jacobus; Abdalla, Nabil Ahmed; and Harrewijne, Arend, 3,974,054.

Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, to Pentel Kabushiki Kaisha. Tablet for use in a coordinate digitizer. 3,974,332, Cl. 178-18.000.

Abel, Donald J., to Engineered Sinterings and Plastics, Inc. Electromagnetic indicator. 3,973,726, Cl. 235-92.00A.

Abeta, Sadaharu: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.

Abler, Norman C.: *See—*
Golladay, James D.; and Abler, Norman C., 3,973,414.

Abolins, Visvaldis: *See—*
Cooper, Glenn D.; and Abolins, Visvaldis, 3,974,235.

Abraham, William W.: *See—*
Lanahan, John H.; and Abraham, William W., 3,974,361.

Acushnet Company: *See—*
Schweiker, George C.; and Jepson, John W., 3,974,238.

Adachi, Ikuo: *See—*
Okumura, Osamu; Yaguchi, Katsumi; Adachi, Ikuo; and Nagayama, Masuzo, 3,974,211.

Adams, James R., Jr.; and Wilwerding, Dennis J., to Honeywell Inc. Electronic flash apparatus with inhibition of contact bounce false triggering. 3,974,419, Cl. 315-241.00P.

Adams, Lyle C., to Macotech Corporation. Quick response circuit for control of a machine tool apparatus. 3,974,431, Cl. 318-561.000.

Adams, Thomas H., to Du Pont de Nemours, E. I., and Company. Process for measuring carbon dioxide content of the body fluid. 3,974,037, Cl. 195-103.50R.

Adey, Anthony John: *See—*
Williams, Malcolm; Brunt, Geoffrey Albert Kenyon; Jones, Christopher Robin; and Adey, Anthony John, 3,973,537.

Advanced Technology Laboratories, Inc.: *See—*
Levi, Enrico, 3,973,926.

AEG-Kanis Turbinenfabrik GmbH: *See—*
Kalb, Hans, 3,973,591.

Aeronca, Inc.: *See—*
Logsdon, Hillard Glenn, 3,973,590.

Aeroquip Corporation: *See—*
Evans, Bryce B., 3,973,782.

Affiliated Medical Research, Inc.: *See—*
Gadekar, Shreekrishna M., 3,974,281.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Pouey, Michel, 3,973,850.

AGFA-Gevaert, A.G.: *See—*
Frenken, Hans; Schindler, Georg; and Kramer, Horst, 3,973,310.
Gehlert, Rolf; and Winkler, Friedrich, 3,973,841.
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, 3,973,979.
Schwille, Dieter; Seiz, Hermann; Sorg, Ewald; and Sommer, Udo, 3,974,294.

Agritec Co.: *See—*
McKenzie, John H., 3,973,355.

Ah, Chang Kun. Shoes having vents for ventilating fresh air into the inside of the shoes. 3,973,336, Cl. 36-3.00B.

Ahir, Vallabhbhai Bhanabhai: *See—*
Foster, John; and Ahir, Vallabhbhai Bhanabhai, 3,974,104.

Ahluwalia, Surendra S., to Libbey-Owens-Ford Company. Method and apparatus for turning over sheets. 3,973,673, Cl. 198-285.000.

Air Products and Chemicals, Inc.: *See—*
Jones, John Paul, 3,974,495.

Airfix Industries Limited: *See—*
Sutch, Brian Leo Chudleigh, 3,973,689.

Aisenberg, Sol; and Chang, Kuo Wei, to United States of America, Navy. Dual field excitation for a carbon dioxide laser. 3,974,458, Cl. 331-94.5PE.

Aisin Seiki Kabushiki Kaisha: *See—*
Inada, Masami; and Kondo, Toshiyuki, 3,973,806.
Ueda, Atsumi, 3,973,580.

Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, to Toray Industries, Inc. Method for producing cyclohexene by dehydration of cyclohexanol. 3,974,232, Cl. 260-666.00A.

Ajinomoto Co., Inc.: *See—*
Kobayashi, Tadao; Yamanoi, Akio; and Otsuka, Shin-Ichiro, 3,974,030.

Akademie Nauk SSSR: *See—*
Volpin, Mark Afimovic; Hetfleja, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.

Akagiri, Kenzo: *See—*
Takeda, Masashi; and Akagiri, Kenzo, 3,974,400.

Akai Electric Company Limited: *See—*
Fukatsu, Motonori; and Nakano, Tatsumi, 3,974,522.

Akopov, Ernest Mikhailovich; and Postolov, Petr Moiseevich. Surgical instrument for stitching organs with the aid of metal staples. 3,973,709, Cl. 227-19.000.

Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
Thorsell, Sven-Erik; and Tell, Lars Erik Karl Axel, 3,973,737.

Aktiebolaget Platmanufaktur: *See—*
Nilsson, Claes Torsten, 3,973,736.

Aktiebolaget Tudor: *See—*
Benson, Anders, 3,973,820.

Akzo N.V. of Arnhem, Holland: *See—*
Gerlach, Klaus; Pitowski, Hans Jurgen; and Schneider, Klaus, 3,974,320.

Akzona Incorporated: *See—*
Nilgens, Heinrich; Ostertag, Karl; and Scheiber, Herbert, 3,973,739.

Albers, Edwin Wolf: *See—*
Lussier, Roger Jean; Magee, John Storey, Jr.; Albers, Edwin Wolf; and Surland, George John, 3,974,099.

Albes, Friedrich; Kleemann, Werner; and Ziemek, Gerhard, to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Production of corrugated tubing. 3,973,424, Cl. 72-177.000.

Alder, Hanspeter, to Swiss Aluminium Ltd. Process for the electrolysis of a molten charge using inconsumable anodes. 3,974,046, Cl. 204-67.000.

Aldridge, Clyde L.: *See—*
Segura, Marnell A.; Aldridge, Clyde L.; Riley, Kenneth L.; and Pine, Lloyd A., 3,974,096.
Wheelock, Kenneth S.; and Aldridge, Clyde L., 3,974,256.

Alibeckoff, Galib-bey Atam, to Nylonge Corporation. All purpose wipe material. 3,974,319, Cl. 428-283.000.

Allen-Bradley Company: *See—*
Struger, Odo J.; and Searcy, William W., 3,974,484.

Allen, Henry C.: *See—*
Cucksee, Marjorie T.; and Allen, Henry C., 3,974,004.

Allied Chemical Corporation: *See—*
Duggan, Raymond J., 3,974,221.
Eibeck, Richard E.; Fox, William B.; and Sukornick, Bernard, 3,974,265.

Allis-Chalmers Corporation: *See—*
Doll, Duane E.; and Baker, Douglas H., 3,973,869.
Eyster, Paul J.; and Yanek, Edward J., 3,973,876.

Allison, Kenneth C. Electrode. 3,973,557, Cl. 128-2.06E.

Allmanna Svenska Elektriska Aktiebolaget: *See—*
Elvin, Sten, 3,974,435.

Alpha Metals, Inc.: *See—*
Brous, Jack, 3,973,572.

Alskog, A. Magnus, to AB Lectrostatic. Apparatus for electrodynamically separating particles from a gas. 3,973,932, Cl. 55-132.000.

Althuis, Thomas H.; Czuba, Leonard J.; Hess, Hans-Jurgen E.; and Kadin, Saul B., to Pfizer Inc. Fused pyrimidin-4(3H)-ones as antiallergy agents. 3,974,161, Cl. 260-256.40F.

Alves, Joseph Ferrierea, III, to RCA Corporation. Apparatus for indicating over-current condition in a transistor amplifier. 3,974,438, Cl. 323-9.000.

Alvey Inc.: *See—*
Frost, Lawrence, 3,973,672.

Amalgamated Dental Company Limited, The: *See—*
Foster, John; and Ahir, Vallabhbhai Bhanabhai, 3,974,104.

Amalgamated Sugar Company, The: *See—*
Schoenrock, Karlheinz W. R.; and Rounds, Hugh G., 3,973,986.

American Chain & Cable Company, Inc.: *See—*
Knudsen, Kenneth F., 3,973,504.

American Cyanamid Company: *See—*
Giglia, Robert Domenico, 3,973,829.
Rauhut, Michael McKay; and Semsel, Andrew Milo, 3,974,086.
Rauhut, Michael McKay, 3,974,368.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 3,974,083.

American Home Products Corporation: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 3,974,179.
Santilli, Arthur A.; Scotese, Anthony C.; and Tomarelli, Rudolph R., 3,974,162.

American Hospital Supply Corporation: *See—*
Choksi, Pradip V., 3,974,008.
Trafton, John E.; Nichols, Philip E.; and Haynes, Royce, 3,973,912.

American Velcro, Inc.: *See—*
Penn, Franklin E.; Fletcher, Walter B.; Rosa, Edmund; and Perina, Joseph, 3,973,834.
Amerock Corporation: *See—*
Entrikin, Ronald K., 3,973,814.
Ames, John B. Dispenser for moist tissues. 3,973,695, Cl. 221-63.000.
AMF Incorporated: *See—*
Patel, Bahechar S.; and Moore, Thomas W., 3,974,437.
Amici, Francesco: *See—*
Brugnoli, Maria; and Amici, Francesco, 3,973,751.
Amos, Russell J. Carburetor aerator. 3,973,534, Cl. 123-119.00D.
AMP Incorporated: *See—*
Lockard, Joseph Larue, 3,974,347.
Amtel, Inc.: *See—*
Sussmuth, Reiner W., 3,973,861.
Anaconda Company, The: *See—*
Horton, Steven A., 3,973,321.
Andersen, Ariel. Apparatus for canning food. 3,973,480, Cl. 99-359.000.
Anderson, Andrew W.; and Mullin, John P., to Scandia Packaging Machinery Company. Closure mechanism for food tray covers. 3,973,374, Cl. 53-333.000.
Anderson, Matthew E.; and Menz, Fredric L., to United States of America, Navy. Safe rocket motor igniter using sequenced initiation to an explosive logic network. 3,973,499, Cl. 102-70.00R.
Angelini, Sergio, to Brevetti Elettrogalvanici Superfiniture. Method and apparatus for electroplating. 3,974,042, Cl. 204-25.000.
Angenendt Verpackungssysteme GmbH: *See—*
Wenzel, Kurt, 3,973,790.
Anglo-American Clays Corporation: *See—*
Nott, Alan J., 3,974,067.
Anheuser-Busch, Incorporated: *See—*
Voigt, John E.; and Bovier, Edward M., 3,973,985.
Ann Arbor Circuits, Inc.: *See—*
Jogwick, Kurt W., 3,974,056.
Aoki, Takashi: *See—*
Nishikawa, Masao; Toshimitsu, Yoshihiko; and Aoki, Takashi, 3,973,640.
Appenzeller, Valentin, to Kusters, Edward. Apparatus for the continuous pressure treatment of a web. 3,973,483, Cl. 100-93.0RP.
Aptroot-Soloway, Bernard. Data entry systems. 3,974,496, Cl. 340-337.000.
Arano, Isamu, to Hitachi, Ltd. Ignition timing adjusting device for an internal combustion engine. 3,973,533, Cl. 123-117.00A.
Archer, Wesley L.; and Spencer, David R., to Dow Chemical Company, The. Stabilized 1,1,1-trichloroethane. 3,974,230, Cl. 260-652.50R.
Arimura, Iwao; and Suzuki, Yasuo, to Bridgestone Tire Company Limited. Device for making pneumatic tires. 3,974,018, Cl. 156-394.000.
Armstrong Cork Company: *See—*
Gilbo, Charles F.; and Glassman, Alan S., 3,973,854.
Armstrong, John Richard Carew; and Marshall, Denis John, to BOC International Limited. Underwater welding. 3,973,712, Cl. 228-57.000.
Arnold, Richard B.; and Straley, Larry W., to General Electric Company. Apparatus and method for use in developing wound coils. 3,973,601, Cl. 140-92.100.
Artistic Identification Systems, Inc.: *See—*
Cox, Thaddeus Hall, Jr., 3,974,010.
Asaeda, Toshio; Suzuki, Ikuo; and Imai, Tomoyasu, to Asaeda, Toshio; and Toyoda Koki Kabushiki Kaisha, part interest to each. Manufacturing process for a metal bonded grinding tool and the metal bonded grinding tool produced thereby. 3,973,925, Cl. 51-295.000.
Asayama, Kingo, to Kabushiki Kaisha Takechi Koumusho. Apparatus for establishing an anchor. 3,973,409, Cl. 61-39.000.
Ashby, Bruce A., to General Electric Company. Process for producing methyltriacetoxysilane. 3,974,198, Cl. 260-448.20E.
Ashley-Butler, Inc.: *See—*
Sharpless, Edward N., 3,974,317.
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, to Sperry Rand Corporation. Miniature underwater bore hole inspection apparatus. 3,974,330, Cl. 178-6.800.
Astrophysics Research Corporation: *See—*
van der Sande, Jan J., 3,974,376.
Ateliers de Constructions Electriques de Charlerol (ACEC): *See—*
Hance, Pierre G., 3,973,871.
Atherton, Dewitt T. Tide motor. 3,973,864, Cl. 415-8.000.
Atkinson, Edward Browell, to Bakelite Xylonite Limited. Profile determining and/or controlling system. 3,974,248, Cl. 264-40.200.
Atkinson, Wallace E., to Long Manufacturing Co., Inc. Combination lock construction for luggage zipper locks, shackle locks and the like. 3,973,419, Cl. 70-68.000.
Atlantic Richfield Company: *See—*
Erickson, Henry; and Mooi, John, 3,974,255.
Miles, Leon H., 3,973,626.
Worrell, G. Richard; Hirsig, Alan R.; and Grane, Henry R., 3,974,214.
Atlas Copco Aktiebolag: *See—*
Brannstrom, Kurt Osten, 3,973,633.
Jagerstrom, Axel Henry, 3,973,747.
Persson, Jan Edvard; and Ekman, Sven Axel, 3,973,634.
Atomic Energy of Canada Limited: *See—*
Hammerli, Martin; and Butler, John P., 3,974,048.
Auckenthaler, Robert, to SIG Schweizerische Industrie-Gesellschaft. Apparatus for making bags. 3,973,474, Cl. 93-18.000.
Audichron Company, The: *See—*
Luzier, Harman E.; Colt, Jon C.; and Cobb, Douglas R., 3,974,338.
Augeri, Joseph L., to Nestle Company Inc., The. Method of producing a blown bottle having means determinative of relationship between the bottle body and the annular position of associated means mounted on the finish. 3,973,941, Cl. 65-79.000.
Austrian Ski and Machine Corporation: *See—*
Kern, Walter J., 3,973,860.
Automatic Material Handling, Inc.: *See—*
Keller, Alex Jacques, 3,973,683.
Automobiles Peugeot: *See—*
Poisson, Bernard; and Steydle, Guy, 3,973,858.
Toulc'hoat, Alain; and Papot, Michel, 3,973,432.
Avco Corporation: *See—*
Shank, Wayne C., 3,973,873.
Avery International: *See—*
Pekko, John A.; and Cardenas, Robert J., 3,973,788.
Avnet, Inc.: *See—*
Guha, Dwipendra Nath, 3,973,777.
Marks, Larry D.; Palmer, Lynn D.; and Jensen, Theodore F., 3,973,778.
Awaya, Juichi: *See—*
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.
Ayers, Peter G., to Procter & Gamble Company, The. Absorbent paper having imprinted thereon a semi-twill, fabric knuckle pattern prior to final drying. 3,974,025, Cl. 162-113.000.
B. F. Goodrich Company, The: *See—*
Ramp, Floyd Lester, 3,974,047.
Babcock, John B. Pipefitter's jig. 3,973,765, Cl. 269-37.000.
Babcock & Wilcox Company, The: *See—*
Keller, Arthur; and Monroe, Neil J., 3,973,523.
Babson, Edward S.; and Gorini, Robert F., to USM Corporation. Method for stiffening workpieces such as shoe components. 3,973,285, Cl. 12-146.00D.
Bach, Jean. Method for effecting uniform heating of an organic product particularly for the purpose of preserving the product and apparatus therefor. 3,974,355, Cl. 219-10.810.
Bachhuber, Philip C., Jr.: *See—*
Bachhuber, Theodore J.; and Bachhuber, Philip C., Jr., 3,973,465.
Bachhuber, Theodore J.; and Bachhuber, Philip C., Jr., to Mayville Engineering Company Incorp. Automatic primer feed for shotgun shell reloader. 3,973,465, Cl. 86-45.000.
Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Endres, Horst; Hertel, Otto; and Miller, Franz-Friedrich, 3,973,904.
Bagowski, Dieter: *See—*
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.
Bailey, Escar L.: *See—*
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,973,442.
Bailey, Wayne. Capturing hydro power, earth power and wind power with means and methods of storing same. 3,974,394, Cl. 290-44.000.
Bajek, Walter A.; and McLaughlin, James H., to Universal Oil Products Company. Control of hydrogen/hydrocarbon mole ratio and the control system therefor. 3,974,064, Cl. 208-134.000.
Bakelite Xylonite Limited: *See—*
Atkinson, Edward Browell, 3,974,248.
Baker, Douglas H.: *See—*
Doll, Duane E.; and Baker, Douglas H., 3,973,869.
Baker, Theodore C.: *See—*
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., 3,973,815.
Balane, David A.; and Manzeck, Herman P., to Inryco, Inc. Composite preset block for underfloor wire distribution systems. 3,973,366, Cl. 52-99.000.
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich. Storage and display apparatus. 3,974,482, Cl. 340-172.500.
Baldwin Electronics, Inc.: *See—*
Hafle, Ralph S., 3,974,428.
Ball Corporation: *See—*
Cerny, Daryl D.; Cannon, Robert W.; Okeley, Robert E., II; and Sannella, Joseph L., 3,973,496.
Ball, Kenneth H., to Walt Disney Productions. Collision avoidance system. 3,973,746, Cl. 246-187.00B.
Ballard, Hyde Whitcomb. Conversion mechanism for linear to rotary motion. 3,973,445, Cl. 74-89.210.
Balli, Heinz; and Egger, Albert, to Ciba-Geigy Corporation. Furanes, their manufacture and use. 3,974,180, Cl. 260-335.000.
Ballin, Gene. Tie strip. 3,973,610, Cl. 150-3.000.
Balston, John C., to Rucker Company, The. Bollard. 3,973,511, Cl. 114-218.000.
Balzers Patent und Beteiligungs AG: *See—*
Kraus, Thaddaus, 3,973,929.
Rettinghaus, Gerhard; and Fluckiger, Rudolf, 3,974,380.
Bandamatic System Service Kabushiki Kaisha: *See—*
Nakane, Jun, 3,973,721.
Barbieri, Thomas: *See—*
Brand, Lawrence W.; Barbieri, Thomas; and McCalmont, David, 3,973,675.

Barker, Leslie C. Anti-theft device for motor vehicles. 3,973,641, Cl. 180-114.000.

Barlow, Charles Brian; White, Brian Graham; and Tomlin, Clive Dudley Spencer, to Imperial Chemical Industries Limited. Certain diazines as plant pesticides. 3,974,276, Cl. 424-250.000.

Barlow, Gordon A.: *See—*
Glass, Marvin I.; Barlow, Gordon A.; and Licitis, Gunars, 3,973,773.

Barnea, Eli: *See—*
Mizrahi, Joseph; and Barnea, Eli, 3,973,759.

Barnum, Harry W.: *See—*
Oswald, Alexis A.; and Barnum, Harry W., 3,974,125.

Baron, Joseph J., Jr.; and Krefting, Sherman, to Diamond Shamrock Corporation. Yarn sizing process and product. 3,974,321, Cl. 428-395.000.

Barone, Bruno J., to Petro-Tex Chemical Corporation. Preparation of hydroperoxides by autoxidation. 3,974,228, Cl. 260-610.00B.

Barrett, Edward J.: *See—*
Jarrett, Ronald T.; and Barrett, Edward J., 3,973,484.

Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger Q., to Disston, Inc. Cordless grass trimmer having removable battery pack. 3,973,378, Cl. 56-11.900.

Baryshnikov, Feaor Anisimovich: *See—*
Popov, Igor Vasilievich; Bochkarev, Gely Romanovich; Lebedev, Vitaly Fedorovich; and Baryshnikov, Feaor Anisimovich, 3,974,070.

BASF Aktiengesellschaft: *See—*
Decker, Martin; Schoenleben, Willibald; Toussaint, Herbert; and Hoffmann, Hewig, 3,974,159.
Dehnert, Johannes; and Lamm, Gunther, 3,974,123.

BASF Wyandotte Corporation: *See—*
Gokhale, Sudarshan D., 3,974,058.
Terminiello, Michael A., 3,973,884.

Bate, Anthony John, to Girling Limited. Shoe-drum brakes for vehicles. 3,973,473, Cl. 92-52.000.

Bates, Alvin G.; and McGovern, Terrence L., to United States of America, Navy. Time and frequency control unit. 3,974,457, Cl. 331-1.00A.

Bauer, Peter: *See—*
Stouffer, Ronald D.; and Bauer, Peter, 3,973,558.

Baugh, Benton F., to Vetco Offshore Industries, Inc. Underwater connection apparatus. 3,973,625, Cl. 166-.600.

Baum, Heinz, to Siemens Aktiengesellschaft. Use of equalizers in satellite communication transmission systems. 3,974,448, Cl. 325-1.000.

Bayer Aktiengesellschaft: *See—*
Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, 3,974,275.
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 3,974,278.
Buchel, Karl Heinz; Kramer, Wolfgang; and Frohberger, Paul-Ernst, 3,974,174.
Hoffmann, Hellmut; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,974,171.
Hurm, Karl; and Schmidt, Wolfhard, 3,974,130.
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 3,974,140.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,141.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,142.
Kurz, Jurgen; Kolling, Heinrich; and Federmann, Manfred, 3,974,204.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,974,290.
Schrock, Wilfried; Metzger, Karl-Georg; and Konig, Hans-Bodo, 3,974,288.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 3,974,224.
Woditsch, Peter; Hill, Kurt; Hund, Franz; and Rodi, Fritz, 3,974,079.

Bean, Lloyd F., to Xerox Corporation. Imaging method including exposure of photoconductive imaging member through lenticular lens element. 3,973,954, Cl. 96-1.00R.

Bean, Lloyd F., to Xerox Corporation. Method including exposure of deformation imaging member through lenticular lens element. 3,973,958, Cl. 96-1.100.

Beattie, Thomas R.; and Christensen, Burton G., to Merck & Co., Inc. Cephalosporin compounds. 3,974,151, Cl. 260-243.00C.

Beatty, Charles L.: *See—*
Lindblad, Nero R.; Till, Henry R.; and Beatty, Charles L., 3,973,845.

Becker, Klaus; Wolsi, Karl-Heinz; and Purath, Bernd, to Demag Aktiengesellschaft. Sled. 3,973,785, Cl. 280-11.000.

Beecham Group Limited: *See—*
Billington, Arthur Ernest, 3,974,271.
Buckle, Derek Richard; Smith, Harry; and Cantello, Barrie Christian Charles, 3,974,289.
Engel, Kurt; and Thorne, David Edward, 3,974,282.
Nayler, John Herbert Charles; Pearson, Michael John; and Southgate, Robert, 3,974,154.

Begala, Arthur James, Jr.: *See—*
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 3,974,083.

Behrenz, Wolfgang: *See—*
Hoffmann, Hellmut; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,974,171.

Beisch, Hans R.; and Marks, Harold C., to Norris Industries, Inc. Wheel trim retention means. 3,973,801, Cl. 301-37.00C.

Belichenko, Vladimir Ivanovich: *See—*
Ulyanitsky, Evgeny Mefodievich; Streltsov, Vladimir Semenovich; Belichenko, Vladimir Ivanovich; and Mikhailov, Vladimir Vladimirovich, 3,974,423.

Bell Telephone Laboratories, Incorporated: *See—*
Bondybey, Vladimir Edmund; and Fitch, Arthur Haines, 3,974,016.
Casey, Horace Craig, Jr.; Cho, Alfred Yi; and Panish, Morton B., 3,974,002.
Chemelli, Robert Guido; and Miller, Richard Carrel, 3,974,507.
Falconer, David Duncan, 3,974,449.
Lewis, Basil Charles, Jr.; Mathews, James Robert; and Von Ohlsen, Louis Henry, Jr., 3,974,518.
May, Carl Jerome, Jr.; and Sorin, Victor Basil, 3,974,333.

Bennett, John E.: *See—*
Elliott, Joseph E.; Stillman, Neil W.; and Bennett, John E., 3,974,051.

Benninghoff, Fritz: *See—*
Korner, Otto; Benninghoff, Fritz; and Spies, Klaus, 3,973,807.

Benson, Anders, to Aktiebolaget Tudor. Terminal post connection especially for storage batteries. 3,973,820, Cl. 339-230.00R.

Berg, Alan D., to General Motors Corporation. Swiveling and folding bench seat. 3,973,799, Cl. 297-341.000.

Bergeron, Charles R., to Ethyl Corporation. Process for purification of phosphonitrilic chloride polymers. 3,974,261, Cl. 423-300.000.

Berggren, L. John; and Reilly, Joseph R., to Monsanto Company. Forming molecularly oriented containers from preforms. 3,973,897, Cl. 425-387.00B.

Berkowitz, Murray, to Curtiss-Wright Corporation. Method and apparatus for cooling diecasting mold. 3,973,617, Cl. 164-113.000.

Berlinger, Bernard E., Jr., to Quaker City Gear Works, Inc. Windshield wiper drive assembly. 3,973,449, Cl. 74-421.00A.

Bernacki, Stephen E., to Massachusetts Institute of Technology. Lithographic mask attraction system. 3,974,382, Cl. 250-327.000.

Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich. Process and cyclone reactor for fire decontamination of industrial waste water containing organic and refractory mineral impurities. 3,974,021, Cl. 159-4.00A.

Bernasconi, Raymond, to Ciba-Geigy Corporation. Benzothiophenes. 3,974,280, Cl. 424-263.000.

Bernstein, Martin David: *See—*
Bow, William James; and Bernstein, Martin David, 3,973,621.

Berry, Foster W., to Brunswick Corporation. Method of forming compression molded article. 3,974,015, Cl. 156-245.000.

Bertele, Erhard; and Schudel, Peter, to Givaudan Corporation. Process for preparation of terpene flavorants and novel intermediates therefor. 3,974,226, Cl. 260-601.00R.

Berthoux, Jean; and Martinaud, Jacques-Pierre, to Rhone-Progil. Acid extracted-alkalized/carbon catalyst support with coordination complex catalyst and method of manufacture. 3,974,227, Cl. 260-604.0HF.

Besserman, Richard: *See—*
Blackledge, Vernon O., 3,974,335.

Beverung, Warren Neil: *See—*
Partyka, Richard Anthony; Holava, Henry Michael; and Beverung, Warren Neil, 3,974,165.

Bezdek, Milan: *See—*
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 3,974,205.

Bibring, Herve: *See—*
Rabinovitch, Maurice; and Bibring, Herve, 3,973,750.

Bidner, Harvey: *See—*
Boyce, Edward J.; and Bidner, Harvey, 3,973,706.

Bieber, Clarence George; Mihalisin, John Raymond; and Galka, John Joseph, to International Nickel Company, Inc., The. Heat resistant alloy casting. 3,973,952, Cl. 75-171.000.

Bigge, Barton: *See—*
Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, 3,973,367.

Billington, Arthur Ernest, to Beecham Group Limited. Lipstick containing 8-amino-2-(azo-benzene-4-sulphonic acid)-1-naphthol-3,6-disulphonic acid or an edible salt thereof. 3,974,271, Cl. 424-64.000.

Bindra, Jasjit S.: *See—*
Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,974,213.

Bingham, John Francis, to Ferro Corporation. Coated pigments. 3,973,982, Cl. 106-298.000.

Birchall, James Derek; Cowap, David; and Park, Joseph, to Imperial Chemical Industries Limited. Filtration method. 3,974,072, Cl. 210-65.000.

Bird, David A.: *See—*
Fett, Darrell L.; Bird, David A.; and Rauser, Jerry L., 3,974,402.

Bird, Jack Raymond, to Rolls-Royce (1971) Limited. Turbine discs and blades for gas turbine engines. 3,973,875, Cl. 416-241.00B.

Bischoff, Robert F., Jr. Process of forming moldable polymers. 3,974,252, Cl. 264-299.000.

Black, James A. Web printer. 3,973,489, Cl. 101-115.000.

Black, James A. Rocker press with squeegee and web feed means. 3,973,490, Cl. 101-124.000.

Black, James A.; and Farwell, Harry Russell, to Black, James A. Web slit registry. 3,973,492, Cl. 101-126.000.
Black, James A.; and Farwell, Harry Russell, to Black, James A. Web stencilling and drying apparatus. 3,973,493, Cl. 101-126.000.
Black, James A.: *See—*
Porth, Frank L.; Black, James A.; and Farwell, Harry Russell, 3,973,491.
Black, Kyle M.: *See—*
Russell, Ronald W.; and Black, Kyle M., 3,974,456.
Blackledge, Vernon O., to Besserman, Richard. Hearing test by telephone including recorded results. 3,974,335, Cl. 179-1.00N.
Blauer, Maurice. Armored garment. 3,973,275, Cl. 2-2.500.
Bleeker, George H.; and Geis, David G. Centralized monitor and alarm system for monitoring remote areas with acoustical electric transducers. 3,974,489, Cl. 340-261.000.
Block, Ira Jordan; and Sokol, Phillip Edward, to Gillette Company, The. Esters of maleic anhydride interpolymers. 3,974,128, Cl. 526-14.000.
Bloom, Joseph Louis, to Joseph Lucas (Industries) Limited. Fluid control valves. 3,973,577, Cl. 137-82.000.
Bloomfield, David P.; and Landau, Michael B., to United Technologies Corporation. Pressurized fuel cell power plant with steam flow through the cells. 3,973,993, Cl. 136-86.00C.
Blount, William W., Jr.: *See—*
Venor, William J.; Hoppe, John C.; and Blount, William W., Jr., 3,973,963.
Blumenthal, John, to Gould Inc. Air purging system for a pulsed droplet ejecting system. 3,974,508, Cl. 346-140.00R.
BOC International Limited: *See—*
Armstrong, John Richard Carew; and Marshall, Denis John, 3,973,712.
Bochkarev, Gely Romanovich: *See—*
Popov, Igor Vasilievich; Bochkarev, Gely Romanovich; Lebedev, Vitaly Fedorovich; and Baryshnikov, Feaor Anisimovich, 3,974,070.
Bock, Jan; Lundberg, Robert D.; Phillips, Robert R.; and Makowski, Henry S., to Exxon Research and Engineering Company. Thermoplastic elastomer compositions. 3,974,240, Cl. 260-897.00B.
Bock, Jan: *See—*
Lundberg, Robert D.; Phillips, Robert R.; Westerman, Lowell; and Bock, Jan, 3,974,241.
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., to Owens-Illinois, Inc. Assembly and sealing of gas discharge panel. 3,973,815, Cl. 316-20.000.
Bodenseewerk Perkin-Elmer & Co. GmbH: *See—*
Gonner, Winfried Karl, 3,973,792.
Boe, Arnold. Tire change assist tool. 3,973,283, Cl. 7-1.00E.
Boeing Company, The: *See—*
James, Varnell L., 3,974,313.
Kennedy, Paul B., 3,973,996.
Boelens, Harmannus, to Naarden International, N.V. Methyl-N-(2-methyl-pentylidene)-anthranilate for perfume and flavoring compositions. 3,974,201, Cl. 260-471.00R.
Boelkins, Wallace G., to Uni-Mist, Inc. Quick disconnect coupling for coaxial fluid lines. 3,973,752, Cl. 251-149.600.
Boie, Immo: *See—*
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, 3,973,979.
Boise Cascade Corporation: *See—*
Owens, William E., 3,973,723.
Bolan, William Bernard; and Hodges, Steve Wayne. Game board apparatus. 3,973,775, Cl. 273-134.0AA.
Boliden Aktiebolag: *See—*
Henriksson, Sten Tycho, 3,973,917.
Bondybey, Vladimir Edmund; and Fitch, Arthur Haines, to Bell Telephone Laboratories, Incorporated. Bonding of thermoplastic coated cylinders. 3,974,016, Cl. 156-272.000.
Bonnet, Robert Yves Gabriel. Collar. 3,973,292, Cl. 24-16.0PB.
Boot, Phillip Handford; and Ellen, Peter Edgington, to Handford Boot Patents Pty. Ltd. Cementitious building cell. 3,973,365, Cl. 52-79.000.
Borg-Warner Corporation: *See—*
Valdiserri, Leo L., 3,974,132.
Borger, Waldemar; Hullmeine, Udo; and Voss, Ernst, to Varta Batterie Aktiengesellschaft. Galvanic cell with solid fluoride ion-conductive electrolyte. 3,973,990, Cl. 136-6.00L.
Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, to Bayer Aktiengesellschaft. 1,4-Dihydropyridine carboxylic acid esters useful as coronary vessel dilators and anti-hypertensives. 3,974,275, Cl. 424-248.000.
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 1,4-Dihydropyridine esters. 3,974,278, Cl. 424-251.000.
Bossert, Friedrich: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,974,290.
Bouchal, Karel: *See—*
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 3,974,205.
Bovier, Edward M.: *See—*
Voigt, John E.; and Bovier, Edward M., 3,973,985.
Bow, William James; and Bernstein, Martin David, to Foster Wheeler Energy Corporation. Heat exchanger. 3,973,621, Cl. 165-83.000.
Bowen, Michael E. Method for coating wood chips with resinous liquid. 3,974,307, Cl. 427-212.000.
Bowers, Brian, to Polymer Corporation Limited. Method for concentration of foaming liquids. 3,974,023, Cl. 159-49.000.
Bowles Fluidics Corporation: *See—*
Stouffer, Ronald D.; and Bauer, Peter, 3,973,558.
Boyce, Edward J.; and Bidner, Harvey, to Jacoby-Bender, Inc. Connection from watchband-carried battery to electronic watch. 3,973,706, Cl. 224-4.00D.
Boyd, David C., to Corning Glass Works. High index ophthalmic glasses. 3,973,976, Cl. 106-53.000.
Boynton, Kenneth G., to Hollis Engineering, Inc. Mass soldering system and method. 3,973,322, Cl. 29-626.000.
BP Chemicals International Limited: *See—*
Dobson, Kenneth Rowland, 3,974,203.
Lawrenson, Malcolm John, 3,974,233.
Bradshaw, Janice: *See—*
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 3,974,153.
Brady, Steven F.; and Edelmann, James Patrick. Lock for medicine cabinets and the like. 3,973,420, Cl. 70-78.000.
Brand, Lawrence W.; Barbieri, Thomas; and McCalmont, David, to Westinghouse Electric Corporation. Protective wrapper for fluorescent lamps and similar fragile articles, and resulting package. 3,973,675, Cl. 206-418.000.
Brandenstein, Manfred: *See—*
Ernst, Horst; Brandenstein, Manfred; and Olschewski, Armin, 3,973,659.
Brannstrom, Kurt Osten, to Atlas Copco Aktiebolag. Hammer device. 3,973,633, Cl. 173-75.000.
Bratthall, Lars; Henriksson, Erik; and Ingesson, Lars Olof, to Stal-Laval Apparat AB. Condenser. 3,973,624, Cl. 165-114.000.
Braunschweigische Maschinenbauanstalt: *See—*
Hentschel, Volkmar, 3,973,984.
Breck, William Louis, Jr.; and Pickle, Jack L., to Farah Manufacturing Company, Inc. Clutch control means for a pneumatic needle positioner. 3,973,658, Cl. 192-86.000.
Breckenfelder, Ernst G., to U.I.P. Engineered Products Corporation. Apparatus for producing non-felt laminar roofing shingles. 3,973,887, Cl. 425-101.000.
Brede, Uwe; and Gawlick, Heinz, to Dynamit Nobel Aktiengesellschaft. Electromagnetic generator for projectiles. 3,973,500, Cl. 102-70.20G.
Breed Corporation: *See—*
Breed, David S., 3,974,350.
Breed, David S., to Breed Corporation. Gas damped vehicular crash sensor with gas being dominant biasing force on sensor. 3,974,350, Cl. 200-61.530.
Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Projecting catapults and view obstructing cylinder. 3,973,774, Cl. 273-95.00R.
Breteler, Hendrik Gehardus Franciscus; and Prins, Hendrik. Axial ball bearing and housing. 3,973,809, Cl. 308-6.00C.
Brevetti Elettrogalvanici Superfiniture: *See—*
Angelini, Sergio, 3,974,042.
Bridgestone Tire Company Limited: *See—*
Arimura, Iwao; and Suzuki, Yasuo, 3,974,018.
Briggs, George S., to United States of America, Navy. Fuze with dual safe positions and armed-safe indicator. 3,973,501, Cl. 102-81.000.
Bright, Clark. Power generating apparatus. 3,974,395, Cl. 290-44.000.
Brinkmann, Ludwig; and Cherdron, Harald, to Hoechst Aktiengesellschaft. Thermoplastic molding compositions. 3,974,234, Cl. 260-857.00G.
Bristol-Myers Company: *See—*
Partyka, Richard Anthony; Holava, Henry Michael; and Beverung, Warren Neil, 3,974,165.
Schreiber, Richard Henry; and Keil, John Gerard, 3,974,137.
British Carpets Ltd.: *See—*
Logan, Robert; and McGregor, Adam, 3,974,020.
British Cellophane Limited: *See—*
Samways, Bruce; Sanderson, Edward George; and Tamlyn, Arthur John Norman, 3,974,118.
British Gas Corporation: *See—*
Gavin, Derek Gabriel, 3,974,098.
British Steel Corporation: *See—*
Savidge, David Harvey; and Wadsworth, Eric, 3,974,442.
Brockett, Frank Howard, III: *See—*
Sullivan, Arthur Francis; and Brockett, Frank Howard, III, 3,973,575.
Brocklehurst, Jack, to Plastona (John Waddington) Limited. Containers for containing carbonated beverages. 3,973,693, Cl. 220-66.000.
Bronner, Karlheinz; Grassme, Ulrich; and Soder, Eickhardt, to Siemens Aktiengesellschaft. X-ray diagnostic apparatus including means for regulating the X-ray tube voltage through the X-ray tube current. 3,974,387, Cl. 250-409.000.
Brooks, Claude H. Cloth or towel rack. 3,973,676, Cl. 211-87.000.
Brouillette, Carl V.; and Hochman, Harry, to United States of America, Navy. Metal article having protective thin film coating and method of applying. 3,974,323, Cl. 428-457.000.
Brous, Jack, to Alpha Metals, Inc. Self-purging apparatus for determining the quantitative presence of derived ions. 3,973,572, Cl. 134-57.00R.
Brown, Earle S., to Union Carbide Corporation. Monovalent metal salts of dodecametal triaconta carbonyls. 3,974,259, Cl. 423-249.000.
Brown, Kenard D. Closed cycle steam turbine system with liquid vortex pump. 3,973,403, Cl. 60-688.000.

Brown, Kenneth M.; and Verachtert, Thomas A., to Universal Oil Products Company. Removal of oxygen from petroleum charge stocks. 3,974,066, Cl. 208-289.000.
Brown Oil Tools, Inc.: *See*—
Cochran, Chudleigh B., 3,973,587.
Browning, Iben; and McClure, Robert E., to McClure, Robert E. Ultrasonic cleaning and sterilizing apparatus. 3,973,760, Cl. 259-72.000.
Broyles, Donald L.: *See*—
Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, 3,973,367.
Brugger, Richard D. Inspection system for reflective and transparent articles. 3,974,378, Cl. 250-223.00B.
Brugnoli, Maria; and Amici, Francesco. Siphon with pressure priming and pneumatic reflux. 3,973,751, Cl. 251-61.100.
Bruinette, Konstant E., to Triple Bee & Prestress (Proprietary) Limited. Cable anchoring equipment. 3,973,297, Cl. 24-122.600.
Brumbaugh, Kenneth H.; and McAlpin, James J., to Exxon Research and Engineering Company. Block copolymer processes. 3,974,237, Cl. 260-878.00B.
Brundell Och Jonsson AB: *See*—
Jonsson, Karl-Erik A., 3,973,607.
Brunson, Raymond D. Time-shareable automatic bowling score computer. 3,974,483, Cl. 340-172.500.
Brunswick Corporation: *See*—
Berry, Foster W., 3,974,015.
Brunt, Geoffrey Albert Kenyon: *See*—
Jones, Christopher Robin; Williams, Malcolm; and Brunt, Geoffrey Albert Kenyon, 3,973,539.
Williams, Malcolm; Brunt, Geoffrey Albert Kenyon; Jones, Christopher Robin; and Adey, Anthony John, 3,973,537.
Buchel, Karl Heinz; Kramer, Wolfgang; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. 1-(1,2,4-Triazolyl-1')-2-phenoxy-4,4-dimethyl-pentan-3-ones. 3,974,174, Cl. 260-308.00R.
Buchi, George H.; and Wuest, Hans, to Firmenich S.A. Process for the preparation of unsaturated aldehydes. 3,974,225, Cl. 260-601.00R.
Buckle, Derek Richard; Smith, Harry; and Cantello, Barrie Christian Charles, to Beecham Group Limited. Coumarin derivatives for the treatment of allergies. 3,974,289, Cl. 424-281.000.
Budininkas, Pranas: *See*—
Saigh, Philip A.; Glueckert, Albert J.; Budininkas, Pranas; and Caldwell, Joseph, Jr., 3,974,075.
Buescher, William E.; and Kerstetter, Donald R., to GTE Sylvania Incorporated. Cathode ray tube cathode. 3,974,414, Cl. 313-331.000.
Buhr, Hermann, deceased (by Buhr, Marlies, heir), to Gebr. Batz, Firma. Spring hook. 3,973,301, Cl. 24-239.000.
Buhr, Marlies, heir: *See*—
Buhr, Hermann, deceased, 3,973,301.
Bunker Ramo Corporation: *See*—
Golladay, James D.; and Abler, Norman C., 3,973,414.
Burbine, William G.: *See*—
Jordan, Merrill E.; and Burbine, William G., 3,973,983.
Burckhardt, Christoph Benedikt; Grandchamp, Pierre-Andre; and Hoffmann, Heinz, to Hoffmann-La Roche Inc. Method of and apparatus for focusing ultrasonic waves in a focal line. 3,974,475, Cl. 340-15.000.
Burgess, Harry L. Drilling mud degasser apparatus and method. 3,973,930, Cl. 55-41.000.
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, to Feodor Burgmann Dichtungswerk, Firma; and Carl Freudenberg, Firma, part interest to each. Sealing arrangement. 3,973,779, Cl. 277-25.000.
Burkwall, Morris P., Jr., to Quaker Oats Company, The. Simulated egg and meat pet food. 3,974,296, Cl. 426-104.000.
Burlington Industries, Inc.: *See*—
Greer, James E., 3,973,417.
Busch, Carl Wilheim; and Stedtnitz, Wolfgang, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Cable for multiple sonar systems. 3,974,473, Cl. 340-3.00D.
Butler, John P.: *See*—
Hammerli, Martin; and Butler, John P., 3,974,048.
Butler Manufacturing Company: *See*—
Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, 3,973,367.
Butzow, Neil W.; and Harris, Bernard, to Rex Chainbelt Inc. Method for making ball and socket type bearings in multiple. 3,974,009, Cl. 156-84.000.
Byk-Gulden Lomberg Chemische Fabrik GmbH: *See*—
Rainer, Georg, 3,974,176.
C.A.V. Limited: *See*—
Jones, Christopher Robin; Williams, Malcolm; and Brunt, Geoffrey Albert Kenyon, 3,973,539.
Shum, Peter Nai-Kee, 3,973,542.
Williams, Malcolm; Brunt, Geoffrey Albert Kenyon; Jones, Christopher Robin; and Adey, Anthony John, 3,973,537.
Williams, Malcolm; Jones, Christopher Robin; and Crookes, Richard William, 3,973,538.
C & C Metal Products Corporation: *See*—
Peterson, Richard J., 3,973,296.
C. Hager & Sons Hinge Manufacturing Company: *See*—
Kluempers, Thomas J., 3,973,357.
C. L. Instruments Limited: *See*—
Rees, James George Arthur, 3,974,505.
Cabot Corporation: *See*—
Jordan, Merrill E.; and Burbine, William G., 3,973,983.
Cahoy, Roger P., to Gulf Research & Development Company. Preemergent chemical method of combating unwanted vegetation. 3,974,218, Cl. 260-558.00P.
Cahoy, Roger P., to Gulf Oil Corporation. Process for manufacture of 3,5-ditert.butyl-4-hydroxybenzaldehyde from 3,5-ditert.butyl-4-hydroxybenzyl alcohol. 3,974,223, Cl. 260-600.00R.
Caldwell, Edward N., to Robertshaw Controls Company. Heat exchange system and method and control device therefor having motion feedback means. 3,973,619, Cl. 165-34.000.
Caldwell, Joseph, Jr.: *See*—
Saigh, Philip A.; Glueckert, Albert J.; Budininkas, Pranas; and Caldwell, Joseph, Jr., 3,974,075.
Camp, Stafford V., III, to Southampton Manufacturing Company, Inc. Apparatus for continuously manufacturing boards. 3,973,893, Cl. 425-324.00R.
Campbell Chain Company: *See*—
Roberts, Alfred M., 3,973,389.
Campbell, Paul K.: *See*—
Stanback, Harris I.; and Campbell, Paul K., 3,973,823.
Campbell, Robert Henry; and Sullivan, Alfred Bay, to Monsanto Company. Preparation of 2-mercaptoazoles. 3,974,170, Cl. 260-306.000.
Canadian Ingersoll-Rand Company Limited: *See*—
Carbonneau, Marcel, 3,973,606.
Cannon, Robert W.: *See*—
Cerny, Daryl D.; Cannon, Robert W.; Okeley, Robert E., II; and Sannella, Joseph L., 3,973,496.
Canon Kabushiki Kaisha: *See*—
Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, 3,974,041.
Minoura, Kazuo, 3,973,831.
Cantello, Barrie Christian Charles: *See*—
Buckle, Derek Richard; Smith, Harry; and Cantello, Barrie Christian Charles, 3,974,289.
Cappel, Fred, to Dravo Corporation. Sintering process and apparatus. 3,973,762, Cl. 266-135.000.
Capsule Clutch Inc.: *See*—
Leopold, Donald L.; and Moulton, Clifford C., Sr., 3,973,660.
Carbonneau, Marcel, to Canadian Ingersoll-Rand Company Limited. Debarking apparatus having angled drum sections. 3,973,606, Cl. 144-208.00B.
Carborundum Company, The: *See*—
Cottis, Steve G.; Economy, James; Storm, Roger S.; and Wohrer, Luis C., 3,974,250.
Murata, Yorihiro, 3,974,315.
Carcia, Peter Francis, to Du Pont de Nemours, E. I., and Company. Resistors and compositions therefor. 3,974,107, Cl. 252-520.000.
Carden, Edward, to Dupaco Incorporated. Anaesthetist's respiration apparatus. 3,973,564, Cl. 128-202.000.
Cardenas, Robert J.: *See*—
Pekko, John A.; and Cardenas, Robert J., 3,973,788.
Cardinale, John, to Lawrence Peska Associates, Inc., a part interest. Guage for grass cutting. 3,973,327, Cl. 33-169.00R.
Caris, Barry M. Snow ski training device. 3,973,333, Cl. 35-29.00R.
Carl Freudenberg, Firma: *See*—
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, 3,973,779.
Carlton, Lewis M.: *See*—
Sparks, Buddy G.; and Carlton, Lewis M., 3,973,550.
Carriere, Jeanne Constance, heiress and legal representative: *See*—
Fehr, Henri; and Carriere, Raymond Lucien, deceased, 3,974,408.
Carriere, Raymond Lucien, deceased: *See*—
Fehr, Henri; and Carriere, Raymond Lucien, deceased, 3,974,408.
Carson, Kenneth G., to Honeywell Inc. Motor control apparatus for three position valve. 3,974,427, Cl. 236-1.00C.
Carter, Melvin A.: *See*—
Steinke, Theodore D.; and Carter, Melvin A., 3,973,763.
Carter-Wallace, Inc.: *See*—
Hunter, H. Eric, 3,973,313.
Caselani, Richard E.; Gilliom, John W.; McFarland, Robert H.; and Perl, Richard L., to Tappan Company, The. Powered circulation oven. 3,973,551, Cl. 126-21.00A.
Casey, Gerald J. Containment boom. 3,973,406, Cl. 61-1.00F.
Casey, Horace Craig, Jr.; Cho, Alfred Yi; and Panish, Morton B., to Bell Telephone Laboratories, Incorporated. MBE growth: gettering contaminants and fabricating heterostructure junction lasers. 3,974,002, Cl. 148-175.000.
Cassano, James R.: *See*—
Sullivan, William A.; Cassano, James R.; and Kingsland, David O., 3,973,846.
Catallo, Frank. Spreader for circular knit fabric tubes. 3,973,304, Cl. 26-84.000.
Catallo, Frank. Apparatus for conditioning and calendering circular knit tubular fabrics. 3,973,305, Cl. 26-81.000.
Catallo, Frank. Method of orienting and calendering circular knit fabric tubes. 3,973,306, Cl. 26-81.000.
Caterpillar Tractor Co.: *See*—
Durgan, Virgil R. C.; and Palma, Milton J., 3,973,429.
Cauvain, Stanley Peter; Hodge, Donald Gordon; Muir, David Donald; and Dodds, Norman James Harold, to Flour Milling and Baking Research Association. Treatment of grain. 3,974,298, Cl. 426-553.000.
CBS Inc.: *See*—
Jahns, Edward R., 3,973,461.
Cegedur GP: *See*—
Lauzier, Rene, 3,973,756.
Celanese Coatings & Specialties Company: *See*—
Datta, Vijay Jang; and White, John David, 3,973,998.

Celanese Corporation: *See—*
Forschirm, Alex S., 3,973,907.
Celli, Aldo. Engine with die cast static parts. 3,973,548, Cl. 123-195.00R.
Cerny, Daryl D.; Cannon, Robert W.; Okeley, Robert E., II; and Sannella, Joseph L., to Ball Corporation. Apparatus for mounting and locking printing plates. 3,973,496, Cl. 101-415.100.
Cervera, Frank, to Lawrence Peska Associates, a part interest. Defroster key case. 3,973,422, Cl. 70-431.000.
Ceskoslovenska akademie ved: *See—*
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 3,974,205.
Lochmann, Lubomir; Coupek, Jiri; and Trekoval, Jiri, 3,974,111.
Volpin, Mark Afimovic; Hetflejs, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.
Cestaro, John P.; and Sokolov, Uriel, to NL Industries, Inc. Lightweight lead-acid battery with laminated electrodes. 3,973,991, Cl. 136-26.000.
CGEE Alsthom: *See—*
Ginhoux, Louis; and Fiesselles, Jacques, 3,973,431.
Chadwick, William H., Jr., to Sherman & Reilly, Inc. Transformer caddie. 3,973,754, Cl. 254-139.100.
Chang, Kuo Wei: *See—*
Aisenberg, Sol; and Chang, Kuo Wei, 3,974,458.
Chapman, Arthur S., to Hughes Aircraft Company. Missile tracking and guidance system. 3,974,383, Cl. 250-342.000.
Chase, Michael John; Smith, Derek Anthony; and Dudley, Michael Alan, to Imperial Metal Industries (Kynoch) Limited. Rocket motor with ablative insulating casing liner. 3,973,397, Cl. 60-253.000.
Chemelli, Robert Guido; and Miller, Richard Carrel, to Bell Telephone Laboratories, Incorporated. Conversion of stripe-geometry junction laser emission to a spherical wavefront. 3,974,507, Cl. 346-76.00L.
Chemiefaser Lenzing Aktiengesellschaft: *See—*
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.
Chemische Werke Huls Aktiengesellschaft: *See—*
Kuepper, Friedrich-Wilhelm; and Streck, Roland, 3,974,231.
Streck, Roland; and Weber, Heinrich, 3,974,092.
Streck, Roland; and Weber, Heinrich, 3,974,094.
Chemtrust Industries Corporation: *See—*
Schneider, Barry L., 3,973,690.
Chen, Shih-Lu; and Murphy, James A., to Corning Glass Works. Method of improving the magnetic properties of cobalt substituted magnetite. 3,974,246, Cl. 264-24.000.
Cheney, Richard F.; Moscatello, Charles L.; and Mower, Frederick J., to GTE Sylvania Incorporated. Process for producing free flowing powder and product. 3,974,245, Cl. 264-10.000.
Cheney, Thomas K.; and Kuczura, Anatol, to North Electric Company. Small modular communications switching system with distributed programmable control. 3,974,343, Cl. 179-18.0ES.
Cherdron, Harald: *See—*
Brinkmann, Ludwig; and Cherdron, Harald, 3,974,234.
Cherrin, Abe: *See—*
Cherrin, Phil, 3,974,311.
Cherrin, Lem: *See—*
Cherrin, Phil, 3,974,311.
Cherrin, Phil, to Cherrin, Abe; and Cherrin, Lem, part interest to each. Shipping documents device. 3,974,311, Cl. 428-43.000.
Chevron Research Company: *See—*
Lind, Wilton H., 3,974,210.
Powell, Bruce E.; and Stangeland, Bruce E., 3,974,065.
Chiba, Keiichi, to Nissan Motor Co., Ltd. Hydraulic pressure control valve. 3,973,581, Cl. 137-116.000.
Chicago Pneumatic Tool Company: *See—*
Groshans, Joseph R., 3,973,362.
Chimura, Hideo: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,973,608.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,974,184.
Chmela, John F.; and Manna, Lee M. Impulse operating flashing beacon. 3,974,369, Cl. 240-6.40R.
Cho, Alfred Yi: *See—*
Casey, Horace Craig, Jr.; Cho, Alfred Yi; and Panish, Morton B., 3,974,002.
Choay S.A.: *See—*
Goulay, Jean, 3,974,215.
Choksi, Pradip V., to American Hospital Supply Corporation. Method of making a frangible closure system for medical liquid container. 3,974,008, Cl. 156-69.000.
Chor, Lawrence C. K., to Minnesota Mining and Manufacturing Company. Multiple penetration aluminum connector and method. 3,973,824, Cl. 339-276.00R.
Choromokos, Robert L. Method and apparatus for feeding, cutting, stripping, coiling and tying off elongated flexible material. 3,973,600, Cl. 140-1.000.
Christensen, Burton G.: *See—*
Beattie, Thomas R.; and Christensen, Burton G., 3,974,151.
Chromalloy American Corporation: *See—*
Kunz, Robert H.; and Davis, Gary L., 3,973,789.
Chrysler United Kingdom Limited: *See—*
Stringer, Roy Ernest, 3,973,620.
Ciba-Geigy AG: *See—*
Garner, Robert; and Petitpierre, Jean Claude, 3,974,175.
Seiler, Herbert; and Dussy, Paul, 3,974,160.
Ciba-Geigy Corporation: *See—*
Balli, Heinz; and Egger, Albert, 3,974,180.
Bernasconi, Raymond, 3,974,280.
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, 3,974,149.
Mutterer, Francis, 3,974,166.
Schroter, Herbert, 3,974,284.
Cirulis, Uldis; and Zacharias, Ellis M., Jr., to Process and Pollution Controls Company. Water pollution monitor. 3,973,430, Cl. 73-61.10R.
Cities Service Company: *See—*
Urban, Eugene M., Jr., 3,974,267.
Citizen Watch Co., Ltd.: *See—*
Yoshida, Masateru; and Natori, Minoru, 3,973,388.
City of Portland, The: *See—*
Cochran, Charles K., 3,974,372.
Clairol Incorporated: *See—*
Walter, Henry J.; and Springer, William E., 3,973,528.
Clancy, David: *See—*
Williams, Winfried Wilbur, Sr.; and Clancy, David, 3,973,373.
Clark Equipment Company: *See—*
Shealy, Noah Alvin, 3,973,450.
Clarke, Ray Allen, to Du Pont de Nemours, E. I., and Company. Azomethine dye solutions. 3,973,903, Cl. 8-92.000.
Cleaver, John C.; Leitner, Gordon F.; and Wiegratz, Fred G., to Water Services of America, Inc. Fluid flow diverter. 3,973,592, Cl. 137-625.430.
Close, Leo R., to Israel, Mrs. Lawrence. Reusable device for attaching an anti-theft monitor to merchandise. 3,973,418, Cl. 70-34.000.
Clouth Gummiwerke AG: *See—*
Spaar, Hermann, 3,973,670.
Cloyd, Harold S., to Nosco Plastics, Inc. Injection molded folding box. 3,973,692, Cl. 220-7.000.
Clutsom-Penn International Limited: *See—*
Wilson, David, 3,973,905.
Cobb, Douglas R.: *See—*
Luzier, Harman E.; Colt, Jon C.; and Cobb, Douglas R., 3,974,338.
Cochran, Charles K., to City of Portland, The. Ornamental lighting standard. 3,974,372, Cl. 240-84.000.
Cochran, Chudleigh B., to Brown Oil Tools, Inc. Check valve assembly. 3,973,587, Cl. 137-496.000.
Cockerell, David, to Electronic Music Studios (London) Limited. Waveform processing. 3,974,334, Cl. 179-1.0SA.
Coen, Ernesto; Parry, Joseph; and Steere, Robin Charles, to Pilkington Brothers Limited. Method of moulding and tempering glass articles. 3,973,942, Cl. 65-83.000.
Coffey, David L., to Nucleus, Inc., The. Mock iodine-125 radiation source. 3,974,088, Cl. 252-301.10R.
Coffman, Robert Lee; and Shiffler, Richard Welty, to Union Carbide Corporation. Silicone hydraulic fluids. 3,974,080, Cl. 252-78.300.
Colenutt, Brian Frank, to General Motors Corporation. Thermal sensor. 3,973,728, Cl. 236-13.000.
Coles, Donald K. Keyboard type musical instrument. 3,973,460, Cl. 84-1.010.
Colgate-Palmolive Company: *See—*
Kenkare, Divaker B.; and Moran, Marius R., 3,974,270.
Weyn, Hendrik Frans, 3,974,082.
Williams, Winfried Wilbur, Sr.; and Clancy, David, 3,973,373.
Colgate, Stirling A., to New Mexico Tech Research Foundation. In situ solution mining of coal. 3,973,628, Cl. 166-283.000.
Collier, Kenneth C.: *See—*
Orcutt, Dee R.; and Collier, Kenneth C., 3,974,359.
Collins, Byron R.; and McVey, Charles I., to General Electric Company. Alumina ceramic lamp having enhanced heat conduction to the amalgam pool. 3,974,410, Cl. 313-42.000.
Collins, John Joseph, to Union Carbide Corporation. Air separation by adsorption. 3,973,931, Cl. 55-58.000.
Colt, Jon C.: *See—*
Luzier, Harman E.; Colt, Jon C.; and Cobb, Douglas R., 3,974,338.
Coltrin, Robert E.; Eakins, Thomas C.; and McIntyre, John E., to Hughes Aircraft Company. Solar cell arrangement for a spin stabilized vehicle. 3,973,745, Cl. 244-173.000.
Commissariat a l'Energie Atomique: *See—*
Lauro, Fernand, 3,974,022.
Compagnia Italiana Montaggi Industriali: *See—*
Perego, Emilio, 3,973,711.
Compagnie de Construction Mechanique Sulzer: *See—*
Fehr, Henri; and Carriere, Raymond Lucien, deceased, 3,974,408.
Compagnie Francaise de Raffinage: *See—*
Weisang, Joseph Edouard; and Engelhard, Philippe, 3,974,097.
Compagnie Generale d'Electricite: *See—*
Sturel, Bernard, 3,974,454.
Compax Corporation: *See—*
Diggle, Edmund A., Jr., 3,973,303.
Compur-Werk Gesellschaft mit beschrankter Haftung & Co.: *See—*
Pross, Wilhelm, 3,974,512.
Conrath, Richard L.: *See—*
Silva, William; and Conrath, Richard L., 3,973,330.
Consolidated Products Corporation: *See—*
Roe, Norman P., 3,973,385.
Continental Gummi-Werke Aktiengesellschaft: *See—*
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.

Contois, Lawrence E.; Rule, Norman G.; and Staudenmayer, William J., to Eastman Kodak Company. Aggregate photoconductive composition containing combination of pyrylium dye salts. 3,973,962, Cl. 96-1.600.

Controls Southeast, Inc.: *See*—
Henderson, James R., 3,973,585.

Cook, John H., to Xerox Corporation. Liquid dispensing apparatus utilizing double acting piston. 3,973,699, Cl. 222-108.000.

Cook, Martin Christopher; and Laundon, Brian, to Glaxo Laboratories Limited. 7β-Isocyano cephalosporin esters and process of preparation. 3,974,150, Cl. 260-243.00C.

Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, to Glaxo Laboratories Limited. 7-Hydrocarbonoxy iminoacetamido-3-carbamoyloxy methylceph-3-em-4 carboxylic acids. 3,974,153, Cl. 260-243.00C.

Cook, Reginald Kenneth: *See*—
George, Brian Victor; and Cook, Reginald Kenneth, 3,974,029.

Cooper, Glenn D.; and Abolins, Vivaldis, to General Electric Company. Blends of a polyphenylene ether resin, alkenyl aromatic resins modified with EPDM rubber and flame retardant. 3,974,235, Cl. 260-876.00R.

Coors Porcelain Company: *See*—
Roy, Donald W.; and Stermole, Franklin J., 3,974,249.

Copal Company Limited: *See*—
Ueda, Minoru, 3,973,339.

Coran, Aubert Yaucher; and Kerwood, Joseph Edward, to Monsanto Company. Poly(thiomaides). 3,974,163, Cl. 260-281.0GP.

Corey, Elias J. Reduction of trans-1-(2-carboxymethyl-3-hydroxy-5-phenylbenzoyloxycyclopentyl)-1-octen-3-one-γ-lactone. 3,974,183, Cl. 260-343.30R.

Corning Glass Works: *See*—
Boyd, David C., 3,973,976.
Chen, Shih-Lu; and Murphy, James A., 3,974,246.
Holzer, Carl R., Jr., 3,973,764.
Panzarino, Joseph N., 3,974,360.
Wilson, Lois E., 3,973,977.

Cornish, George Kent: *See*—
Knollman, Melvin Louis; Cornish, George Kent; and Fowler, Gene Roger, 3,973,380.

Corporation of the President of The Church of Jesus Christ of Latter-Day Saints: *See*—
Jacobs, G. Richard; Peck, Cluff; and Soderquist, Dean G., 3,973,840.

Corsmeier, Robert J.; and Koff, Bernard L., to General Electric Company. Impingement baffle collars. 3,973,874, Cl. 416-97.00A.

Cosden Technology, Inc.: *See*—
Teer, Glenn Edward; Higgins, Jerry Gene; and Warren, George D., 3,974,119.

Cottis, Steve G.; Economy, James; Storm, Roger S.; and Wohrer, Luis C., to Carborundum Company, The. Method for reducing crystalline orientation of para-oxybenzoyl polyesters. 3,974,250, Cl. 264-68.000.

Coulter Information Systems, Inc.: *See*—
Kuehnle, Manfred R., 3,973,956.

Coupek, Jiri: *See*—
Lochmann, Lubomir; Coupek, Jiri; and Trekoval, Jiri, 3,974,111.

Coursen, David Linn, to Du Pont de Nemours, E. I., and Company. Directed-thrust blasting process. 3,973,497, Cl. 102-23.000.

Covey, Rupert A.: *See*—
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 3,974,287.

Cowap, David: *See*—
Birchall, James Derek; Cowap, David; and Park, Joseph, 3,974,072.

Cowles, Christopher S., to Shell Oil Company. Highly-directional acoustic source for use in borehole surveys. 3,974,476, Cl. 340-18.00R.

Cox, Thaddeus Hall, Jr., to Artistic Identification Systems, Inc. Method of stitching and bonding embroideries onto thermoplastic backing sheets. 3,974,010, Cl. 156-93.000.

CPC International Inc.: *See*—
Harjes, Clarence F.; Leach, Harry W.; and Trp, John M., 3,974,032.
Harjes, Clarence F.; and Wermers, Vilas L., 3,974,033.
Horn, Harold E.; and Kimball, Bruce A., 3,974,034.

Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. [1-Hydroximino-2,2-disubstituted-5-indanyloxy-(or thio)]alkanoic acids. 3,974,212, Cl. 260-519.000.

Craig, Gale M., to General Motors Corporation. Incandescent lamp with modified helium fill gas. 3,974,413, Cl. 313-222.000.

Cranberg, Lawrence, to TDN, Inc. Method and apparatus for generating neutrons. 3,974,392, Cl. 250-499.000.

CRC-Crose International, Inc.: *See*—
Nelson, Jerome W.; and Randolph, James B., 3,974,356.

Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, to Hoechst Aktiengesellschaft; and Chemiefaser Lenzing Aktiengesellschaft. Production of flameproof fibers of regenerated cellulose. 3,974,251, Cl. 264-194.000.

Crerar, John David; and Hemsley, John David Crowther, to Fisons Limited. Two stage process for producing ammonium phosphates. 3,974,262, Cl. 423-313.000.

Crerar, John David; Hemsley, John David Crowther; and Hepworth, Ian Clive, to Fisons Limited. Process for producing ammonium phosphate in two stages. 3,974,263, Cl. 423-313.000.

Crevoisier, Rene. Cam controlled grinding machine. 3,973,360, Cl. 51-101.00R.

Crookes, Richard William: *See*—
Williams, Malcolm; Jones, Christopher Robin; and Crookes, Richard William, 3,973,538.

Croop, Edward J.; Saunders, Howard E.; and Westervelt, Dean C., to Westinghouse Electric Corporation. Method of making patterned dry resin coated sheet insulation. 3,974,302, Cl. 427-21.000.

Crosby, Guy A.; Dubois, Grant E.; and Weinshenker, Ned M., to Dynapol. Ionic sweetener. 3,974,299, Cl. 426-548.000.

Cross, Peter Edward; and Gadsby, Brian, to Pfizer Inc. 2 and 3-Substituted-4-(heterocyclic-amino-sulfonyl)benzene sulfonamides. 3,974,155, Cl. 260-247.10R.

Cross, Thomas A.: *See*—
Jowett, Terence W.; and Cross, Thomas A., 3,973,848.

Cross, Thomas R.; and George, Clifford L., to Xerox Corporation. Compact sorting apparatus. 3,973,769, Cl. 271-173.000.

Crouch, Thomas J.; and Hait, Larry G., to Merc-O-Tronic Instruments Corporation. Portable kilovoltmeter. 3,974,445, Cl. 324-123.00R.

Crounse, Nathan N.; and Desai, Kantilal B., to Sterling Drug Inc. Compounds including carboxystyrylphenyl group. 3,974,144, Cl. 260-240.0CA.

Crozier, William: *See*—
Schwemmer, Ronald; and Crozier, William, 3,973,338.

Crum, Andrew Stephenson Dalgleish, to National Forge Company. Hot isostatic press. 3,973,886, Cl. 425-78.000.

Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., to Nordson Corporation. Adhesive gun. 3,973,697, Cl. 222-47.000.

Crystal, Richard G., to Xerox Corporation. Electrostate graphic development of encapsulated materials. 3,974,078, Cl. 252-62.10P.

Cucksee, Marjorie T.; and Allen, Henry C., to United States of America, Army. Extension of pot life of HTPB composite propellants by phosphine oxides. 3,974,004, Cl. 149-7.000.

Cunha, Joseph J. Apparatus for seating the beads on tubeless tires. 3,973,615, Cl. 157-1.210.

Cunningham, Charles, to Regency Electronics, Inc. Battery powered scanning receiver with synchronous power cycling through electrically operable visual indicators. 3,974,452, Cl. 325-470.000.

Cunningham, Charles, Jr., to Regency Electronics, Inc. Dual frequency FM receiver. 3,974,450, Cl. 325-344.000.

Curtis Dyna Products, Corporation: *See*—
Van Den Haak, Johannes, 3,974,441.

Curtis, Huntington W.; and Verkuil, Roger L., to International Business Machines Corporation. Multiplication mode bistable field effect transistor and memory utilizing same. 3,974,486, Cl. 340-173.00R.

Curtiss-Wright Corporation: *See*—
Berkowitz, Murray, 3,973,617.

Cyprus Metallurgical Processes Corporation: *See*—
Goens, Duane N.; and Reynolds, James E., 3,973,949.

Czuba, Leonard J.: *See*—
Althuis, Thomas H.; Czuba, Leonard J.; Hess, Hans-Jurgen E.; and Kadin, Saul B., 3,974,161.

Dahlquist, Lars Christer, to Sunne Gummifabrik AB. Noise-reducing blowing nozzle. 3,973,642, Cl. 181-36.00A.

Daido Seiko Kabushiki Kaisha: *See*—
Itoh, Tetsuro; Takahashi, Tetsuo; and Yamano, Kiyoichi, 3,973,950.

Daikoku, Shoji: *See*—
Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, 3,974,206.

Daimler-Benz Aktiengesellschaft: *See*—
Gotz, Hans, 3,973,478.
Melchinger, Wilhelm, 3,973,881.
Weiss, Eckhard, 3,973,547.

Dando, Thomas Joseph: *See*—
Hewitt, David Edward; and Dando, Thomas Joseph, 3,973,987.

Danta, Randall C.: *See*—
McKinnon, Eugene T.; Drutz, Alvin S.; Danta, Randall C.; and Zetterberg, Niklas F., 3,973,584.

Dany, Franz-Josef: *See*—
Wortmann, Joachim; Dany, Franz-Josef; Prell, Hedwig; and Kandler, Joachim, 3,974,260.

Darling, Raymond A., to Mott Company, The, a part interest. Variable speed fan for heat exchangers. 3,973,657, Cl. 192-58.00R.

Dart Industries Inc.: *See*—
Hardy, Donald F., 3,973,666.

Data General Corporation: *See*—
Hewitt, David Edward; and Dando, Thomas Joseph, 3,973,987.

Datta, Vijay Jang; and White, John David, to Celanese Coatings & Specialties Company. Rinsing solutions for acid cleaned iron and steel surfaces. 3,973,998, Cl. 148-6.14R.

David Gessner Company: *See*—
Spencer, John; Ruepp, Ferdinand; and Whewell, Robert, 3,973,359.

Davis, Gary L.: *See*—
Kunz, Robert H.; and Davis, Gary L., 3,973,789.

Davis, Jacob A.: *See*—
Sanders, Thomas J.; Davis, Jacob A.; and Morcom, William R., 3,974,517.

Davis, Joel T.: *See*—
Davis, William R.; Davis, Joel T.; and Davis, William P., 3,973,281.

Davis, William Folsom, to Motorola, Inc. Integrated circuit interface stage for high noise environment. 3,974,404, Cl. 307-303.000.

Davis, William P.: *See*—
Davis, William R.; Davis, Joel T.; and Davis, William P., 3,973,281.

Davis, William R.; Davis, Joel T.; and Davis, William P. Molded expanded polystyrene bed assembly. 3,973,281, Cl. 5-131.000.

de la Cuadra Herrera, Antonio; Tallante, Miguel Fernandez; and Sanchez, Armando Rodriguez, to Patronato de Investigacion Cientifica y Tecnica "Juan de la Cierva" del Consejo Superior de Investigaciones Cientificas. Process for purifying metallurgical gases containing sulphurous anhydride by extracting mercury. 3,974,254, Cl. 423-210.000.

De La Mare, Harold E., to Shell Oil Company. Polybutadiene resin. 3,974,129, Cl. 204-159.240.

Dean, Melvin, to Raymond Lee Organization, Inc., The, a part interest. Fishing line changer. 3,973,741, Cl. 242-84.10R.

De Boo, Jerome L.; Feldy, Edmund C.; and Grear, Horace Stanley, to Teletype Corporation. Wire-matrix printers, and electromagnetic actuator mechanisms useful in such printers. 3,973,661, Cl. 197-1.00R.

DeCaro, Charles J., to Textron, Inc. Driving tool barrel assembly. 3,973,605, Cl. 144-32.00R.

de Cavaignac, Patrick P.; and Dickinson, Peter D., to Vydec, Inc. Cursor find system for the display of a word processing system. 3,974,493, Cl. 340-324.0AD.

Decca Limited: *See—*
Phipps, Derek John, 3,974,502.
Phipps, Derek John, 3,974,503.

Decker, Elmer L.; and Moon, James, to Decker Engineering. Cable anchor. 3,973,435, Cl. 73-143.000.

Decker Engineering: *See—*
Decker, Elmer L.; and Moon, James, 3,973,435.

Decker, Martin; Schoenleben, Willibald; Toussaint, Herbert; and Hoffmann, Hewig, to BASF Aktiengesellschaft. Manufacture of derivatives of malondialdehyde. 3,974,159, Cl. 260-247.50R.

Dedolph, Richard R., to Gravi-Mechanics Co. Plant growth accelerating apparatus. 3,973,353, Cl. 47-1.200.

Deere & Company: *See—*
Kittle, Carl Edwin, 3,973,398.
Knollman, Melvin Louis; Cornish, George Kent; and Fowler, Gene Roger, 3,973,380.
Obermeier, Albert Anthony; and Thompson, James Edward, 3,973,797.
Petersen, Donald Dean, 3,973,400.
Van Gerpen, Harlan Welbert, 3,973,399.

Degnan, Donald E.: *See—*
Miyakawa, Jimmie; and Degnan, Donald E., 3,973,835.

Dehnert, Johannes; and Lamm, Gunther, to BASF Aktiengesellschaft. Dyes for thermoplastics. 3,974,123, Cl. 260-40.00P.

Demag Aktiengesellschaft: *See—*
Becker, Klaus; Wolsi, Karl-Heinz; and Purath, Bernd, 3,973,785.

DeMand, John, to Wilson Jones Company. Tablet binding machine. 3,973,515, Cl. 118-202.000.

Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., to American Home Products Corporation. 1,3,4,9-Tetrahydropyrano[3,4-b]indole-1-acetamides and derivatives. 3,974,179, Cl. 260-326.280.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Nakagawa, Koji; and Hirano, Kenkiti, 3,973,978.

Denver Wood Products Co.: *See—*
Nesbitt, George G., 3,973,678.

Desai, Kantilal B.: *See—*
Crounse, Nathan N.; and Desai, Kantilal B., 3,974,144.

Desai, Kirit J., to Westinghouse Electric Corporation. Internal moisture removal scheme for low pressure axial flow steam turbine. 3,973,870, Cl. 415-168.000.

Deschamps, Andre: *See—*
Dezael, Claude; Deschamps, Andre; and Gruhier, Henri, 3,974,257.

Deschamps Laboratories, Inc.: *See—*
Deschamps, Nicholas H., 3,973,718.

Deschamps, Nicholas H., to Deschamps Laboratories, Inc. Method of manufacturing a heat exchanger core. 3,973,718, Cl. 228-183.000.

des Reyssiers, Pierre Maurice Malachard: *See—*
LaPorte, Robert Josse; and des Reyssiers, Pierre Maurice Malachard, 3,973,363.

Detection Systems, Inc.: *See—*
Lederer, David B., 3,974,488.

DeTommasi, Arthur N.: *See—*
Girard, Roland T.; Rice, George A.; and DeTommasi, Arthur N., 3,974,304.

Deutsch Fastener Corporation: *See—*
Gulistan, Bulent, 3,973,317.

Deutsch, Ralph: *See—*
Griffith, Glen R.; and Deutsch, Ralph, 3,974,478.

Dewar, Bruce Ian: *See—*
James, George Stephen; Dewar, Bruce Ian; and Moergeli, Walter Rudolf, 3,974,049.

Dezael, Claude; Deschamps, Andre; and Gruhier, Henri, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Process for removing sulfur dioxide contained in a gas. 3,974,257, Cl. 423-242.000.

Dezael, Claude: *See—*
Poitevin, Jean-Pierre; and Dezael, Claude, 3,974,258.

Diamond Shamrock Corporation: *See—*
Baron, Joseph J., Jr.; and Krefting, Sherman, 3,974,321.
Elliott, Joseph E.; Stillman, Neil W.; and Bennett, John E., 3,974,051.
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,974,277.

Dickey-john Corporation: *See—*
Steffen, David E., 3,974,377.

Dickinson, Peter D.: *See—*
de Cavaignac, Patrick P.; and Dickinson, Peter D., 3,974,493.

DIEHL: *See—*
Korner, Otto; Benninghoff, Fritz; and Spies, Klaus, 3,973,807.

Dietiker, Paul; and Green, Norman F., to Honeywell Inc. Gas valve with pilot safety apparatus. 3,973,576, Cl. 137-66.000.

Diggle, Edmund A., Jr., to Compax Corporation. Compactor shoe adjustment for compressive shrinking machines. 3,973,303, Cl. 26-18.600.

Diggs, Richard E. Quick-connect fittings for a trickle type irrigation system. 3,973,732, Cl. 239-271.000.

Digital Equipment Corporation: *See—*
Kotok, Alan; Kent, Allan R.; and Gross, David A., 3,974,479.

Di Martino, John M. Vertical locking system for shipping containers. 3,973,684, Cl. 214-10.50R.

Dinstman, Hyman: *See—*
Solov, Irving; and Dinstman, Hyman, 3,974,351.

Dipsol Chemicals Co., Ltd.: *See—*
Takahashi, Akio; Fukuda, Atsushi; and Igarashi, Toshio, 3,974,045.

Disselnkotter, Hans: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 3,974,140.

Disston, Inc.: *See—*
Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger Q., 3,973,378.

Distler, Walter; Kintopp, Erich; and Linke, Gerhard, to Siemens Aktiengesellschaft. Patients' support installation for a tomographic X-ray apparatus. 3,974,388, Cl. 250-445.00T.

Divisek, Jiri; Faul, Wolfgang; and Kastening, Bertel, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of and apparatus for processing the surface of bodies. 3,974,050, Cl. 204-129.600.

Dix, Earl E.; and Fischer, William H., to Garrett Corporation, The. Inflatable evacuation slide. 3,973,645, Cl. 182-48.000.

Dixon-Bartlett-Lambrecht, Inc.: *See—*
Ecton, W. Robert, 3,973,337.

Dobrovolsky, Anatoly Alexandrovich: *See—*
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Dobson, Kenneth Rowland, to BP Chemicals International Limited. Esters of halogenated alcohols. 3,974,203, Cl. 260-476.00R.

Dobson, Thomas A.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 3,974,179.

Dochterman, Richard W., to General Electric Company. Inductive devices and termination arrangements thereof. 3,974,407, Cl. 310-71.000.

Dodds, Norman James Harold: *See—*
Cauvain, Stanley Peter; Hodge, Donald Gordon; Muir, David Donald; and Dodds, Norman James Harold, 3,974,298.

Doiron, Joseph G. Fishing lure. 3,973,351, Cl. 43-42.060.

Doll, Duane E.; and Baker, Douglas H., to Allis-Chalmers Corporation. Turbine in-take baffles. 3,973,869, Cl. 415-160.000.

Donachiue, James P. Humidifier pad. 3,974,244, Cl. 261-92.000.

Dorfman, Yakov Avraamovich: *See—*
Sokolsky, Dmitry Vladimirovich; Dorfman, Yakov Avraamovich; and Kazantseva, Irina Anatolievna, 3,974,085.

Dorschner, Kenneth P.; and Johnson, Robert P., to SCM Corporation. Cyanoalkyl sulfonates for the control of fungus growth. 3,974,292, Cl. 424-303.000.

Douri, Hisashi; and Oosaki, Tatsuo, to Yoshida Kogyo Kabushiki Kaisha. Slider fitting and end stop applying machine. 3,973,312, Cl. 29-207.5SL.

Dow Chemical Company, The: *See—*
Archer, Wesley L.; and Spencer, David R., 3,974,230.
Dunn, James L., Jr., 3,973,908.
Free, Dustin L., 3,974,077.
Moore, Zack J.; and Goode, John V., Jr., 3,973,852.
Plonka, James H.; and Pews, R. Garth, 3,974,199.
Reding, John Thomas; and Riley, Robert Lee, Jr., 3,974,055.

Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiseevich, deceased (by Ziv, Valentina Spiridonovna, administratrix). Radioactive source. 3,974,322, Cl. 428-433.000.

Dragerwerk Aktiengesellschaft: *See—*
Holst, Rudolf, 3,973,588.

Dravo Corporation: *See—*
Cappel, Fred, 3,973,762.

Dresser Industries, Inc.: *See—*
Martin, Albert Edward; and Fillion, Stanley Herbert, 3,973,681.

Drummond, Ronald B. Crankcase-supported oil drip receiver. 3,973,549, Cl. 123-198.00R.

Drutz, Alvin S.: *See—*
McKinnon, Eugene T.; Drutz, Alvin S.; Danta, Randall C.; and Zetterberg, Niklas F., 3,973,584.

Dubois, Grant E.: *See—*
Crosby, Guy A.; Dubois, Grant E.; and Weinshenker, Ned M., 3,974,299.

Dudley, Michael Alan: *See—*
Chase, Michael John; Smith, Derek Anthony; and Dudley, Michael Alan, 3,973,397.

Dudzinski, Zdzislaw; and Wakeman, Reginald L., to Millmaster Onyx Corporation. Amphoteric surface-active agents. 3,974,208, Cl. 260-501.110.

Duggan, Raymond J., to Allied Chemical Corporation. Process for preparing cyclohexanone from cyclohexanol. 3,974,221, Cl. 260-586.00P.

Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Electrophotographic element having a selenium layer containing arsenic in varying concentrations across the layer thickness. 3,973,960, Cl. 96-1.500.

Duncan, Lloyd P. Stretched teat cup. 3,973,521, Cl. 119-14.470.

Dunn, James L., Jr., to Dow Chemical Company, The. Method for dyeing from solvents. 3,973,908, Cl. 8-176.000.

Dunn, Lyman D.; and Shields, John, to Marlan Company. Water conditioning device. 3,974,071, Cl. 210-57.000.

Dupaco Incorporated: *See—*
Carden, Edward, 3,973,564.

Du Pont de Nemours, E. I., and Company: *See—*
Adams, Thomas H., 3,974,037.
Carcia, Peter Francis, 3,974,107.
Clarke, Ray Allen, 3,973,903.
Coursen, David Linn, 3,973,497.
Fuchs, Julius Jakob; and Lin, Kang, 3,973,947.
Gorrafa, Adly Abdel-moniem, 3,973,386.
Tanikella, Murty S.; and Von Susani, Odorich, 3,974,127.
Wat, Edward Koon Wah, 3,973,946.

Duport, Jacques, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM). Surge generators of the plunger type. 3,973,405, Cl. 61-1.00R.

Durgan, Virgil R. C.; and Palma, Milton J., to Caterpillar Tractor Co. Test apparatus for engine heads. 3,973,429, Cl. 73-49.700.

DuRocher, Gideon A., to Essex International, Inc. Multi-stage switching apparatus. 3,974,470, Cl. 338-114.000.

Dussy, Paul: *See—*
Seiler, Herbert; and Dussy, Paul, 3,974,160.

Dyatlov, Vladimir Semenovich: *See—*
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.

Dynamit Nobel Aktiengesellschaft: *See—*
Brede, Uwe; and Gawlick, Heinz, 3,973,500.
El-Chahawi, Moustafa; and Richtzenhain, Hermann, 3,974,202.

Dynapol: *See—*
Crosby, Guy A.; Dubois, Grant E.; and Weinshenker, Ned M., 3,974,299.

Eagle Shirtmakers, Inc.: *See—*
Rinehimer, Elwood; Walters, Donald M.; and Jarrett, Kenneth L., Sr., 3,973,506.

Eakins, Thomas C.: *See—*
Coltrin, Robert E.; Eakins, Thomas C.; and McIntyre, John E., 3,973,745.

Eastman Kodak Company: *See—*
Contois, Lawrence E.; Rule, Norman G.; and Staudenmayer, William J., 3,973,962.
Venor, William J.; Hoppe, John C.; and Blount, William W., Jr., 3,973,963.

Eaton Corporation: *See—*
Swedberg, Nils Einar, 3,973,880.

Ebner, Heinrich; and Enenkel, Anton, to Heinrich Frings, Firma. Ultrafiltration process and apparatus using low hydrostatic pressure to prevent concentration polarization. 3,974,068, Cl. 210-23.00F.

Ecker, Franklin A.; and Saiia, Anthony J., to Jacobsen Manufacturing Company. Powered lawn mower hydraulic system. 3,973,379, Cl. 56-11.900.

Economy, James: *See—*
Cottis, Steve G.; Economy, James; Storm, Roger S.; and Wohrer, Luis C., 3,974,250.

Ecton, W. Robert, to Dixon-Bartlett-Lambrecht, Inc. Shoe and method of making. 3,973,337, Cl. 36-51.000.

Edelman, Leonard E.: *See—*
Sassano, Daniel R.; and Edelman, Leonard E., 3,974,113.

Edelmann, James Patrick: *See—*
Brady, Steven F.; and Edelmann, James Patrick, 3,973,420.

Edge, Charles K.; and Kunkle, Gerald E., to PPG Industries, Inc. Delivery of molten glass to a glass forming process. 3,973,940, Cl. 65-65.00A.

Edgell, James E.: *See—*
Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger Q., 3,973,378.

Edison, David M.: *See—*
Hummert, George T.; Moser, Thomas D.; Edison, David M.; and Kurland, Marvin, 3,973,648.

Edouard Dubied et Cie (Societe Anonyme): *See—*
Kohler, Fritz, 3,973,416.

Edwin Florence, Limited: *See—*
Florence, Edwin, 3,973,855.

Egger, Albert: *See—*
Balli, Heinz; and Egger, Albert, 3,974,180.

Eguchi, Hisashi, to Iwasaki Tsushinki Kabushiki Kaisha. System for detecting the transmission direction of a signal on a two-way transmission line. 3,974,401, Cl. 307-241.000.

Eguchi, Yasukata; and Hanyu, Susumu, to Janome Sewing Machine Co. Ltd. Sewing machine zipper foot. 3,973,508, Cl. 112-240.000.

Eibeck, Richard E.; Fox, William B.; and Sukornick, Bernard, to Allied Chemical Corporation. Chlorine pentafluoride complexes. 3,974,265, Cl. 423-466.000.

Ekman, Sven Axel: *See—*
Persson, Jan Edvard; and Ekman, Sven Axel, 3,973,634.

El-Chahawi, Moustafa; and Richtzenhain, Hermann, to Dynamit Nobel Aktiengesellschaft. Method of preparing arylacetic acid alkyl esters. 3,974,202, Cl. 260-476.00R.

Electronic Engineering Company of California: *See—*
Yablonski, Robert E., 3,974,434.

Electronic Music Studios (London) Limited: *See—*
Cockerell, David, 3,974,334.

Eli Lilly and Company: *See—*
Paget, Charles J., 3,974,286.

Ellen, Peter Edgington: *See—*
Boot, Phillip Handford; and Ellen, Peter Edgington, 3,973,365.

Eller, Stanley H., to Stripper Insert Corporation. Stripper insert and method of making and using the stripper insert. 3,973,454, Cl. 83-55.000.

Elliott, Joseph E.; Stillman, Neil W.; and Bennett, John E., to Diamond Shamrock Corporation. Production of hypochlorite from impure saline solutions. 3,974,051, Cl. 204-149.000.

Ellis, Merphis C.: *See—*
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, 3,974,330.

Elteba AG: *See—*
Reich, Walter; and Schaffner, Kurt, 3,973,458.

Elvin, Sten, to Allmanna Svenska Elektriska Aktiebolaget. Means for supplying a load object. 3,974,435, Cl. 321-9.00A.

Ely, Charles M.: *See—*
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,974,277.

Emmett, Lionel C. R., to A. H. Robins Company, Incorporated. Intrauterine device of C or omega form. 3,973,560, Cl. 128-130.000.

Emson, Stephen Derek; Norton, Christopher Stephen; and Wilson, James Royston, to Escher Wyss G.m.b.H. Belt press with rotatable cylinder and adjustable pressure member. 3,974,026, Cl. 162-358.000.

Endres, Horst; Hertel, Otto; and Miller, Franz-Friedrich, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Water-soluble synthetic tanning agents. 3,973,904, Cl. 8-94.240.

Enenkel, Anton: *See—*
Ebner, Heinrich; and Enenkel, Anton, 3,974,068.

Engdahl, Paul D. Peak accelerograph. 3,974,504, Cl. 346-7.000.

Engel, Kurt; and Thorne, David Edward, to Beecham Group Limited. Hypoglycemic stilbazolte derivatives. 3,974,282, Cl. 424-263.000.

Engelhard, Philippe: *See—*
Weisang, Joseph Edouard; and Engelhard, Philippe, 3,974,097.

Engelhardt, Dietmar; and Raasch, Hans, to W. Schlafhorst & Co. Self-centering coil holder. 3,973,742, Cl. 242-129.000.

Engfer, Ortwin; and Korkowski, Eberhard, to Robert Bosch G.m.b.H. Apparatus for load-dependent control of vehicle. 3,973,804, Cl. 303-2.000.

Engineered Sinterings and Plastics, Inc.: *See—*
Abel, Donald J., 3,973,726.

England, Will Clarke. Fishing lure with temperature sensing and thermostatically controlled depth selection and guidance means. 3,973,349, Cl. 43-42.030.

England, Will Clarke. Fishing lure with pressure sensing and hydrostatically controlled depth selection and guidance means. 3,973,350, Cl. 43-42.030.

English Clays Lovering Pochin & Company Limited: *See—*
Purdey, John Anthony, 3,974,074.

Enor Nominees Pty. Limited: *See—*
Schmidt, Hans Heinrich, 3,973,885.

Entrikin, Ronald K., to Amerock Corporation. Drawer slide assembly for self-closing drawer. 3,973,814, Cl. 312-333.000.

Erdmann, Dietrich; Schneider, Gerhart; and Koch, Wolfgang, to Merck Patent Gesellschaft mit beschrankter Haftung. Pest control agent. 3,973,944, Cl. 71-88.000.

Erickson, Henry; and Mooi, John, to Atlantic Richfield Company. Method for treatment of engine exhaust gases. 3,974,255, Cl. 423-212.000.

Ermakov, Verlen Nikolaevich: *See—*
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.

Ernst, Horst; Brandenstein, Manfred; and Olschewski, Armin, to SKF Industrial Trading and Development Company, B.V. Friction clutch disk spring and bearing assemblies. 3,973,659, Cl. 192-89.00B.

Erthein, Marc. Garment clamping hanger with pivoted locking clip. 3,973,705, Cl. 223-96.000.

Ervin, Guy, Jr., to Rockwell International Corporation. Method of storing and releasing thermal energy. 3,973,552, Cl. 126-271.000.

Eschenbrenner, Philippe: *See—*
Ledieu, Jean; and Eschenbrenner, Philippe, 3,974,481.

Escher Wyss G.m.b.H.: *See—*
Emson, Stephen Derek; Norton, Christopher Stephen; and Wilson, James Royston, 3,974,026.

Esilevich, Boris Semenovich: *See—*
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil

Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.
Essex International, Inc.: *See—*
DuRocher, Gideon A., 3,974,470.
Ethyl Corporation: *See—*
Bergeron, Charles R., 3,974,261.
Lanier, Carroll W.; and Kao, James T. F., 3,974,242.
Ettenberg, Michael: *See—*
Kressel, Henry; Ettenberg, Michael; and Ladany, Ivan, 3,974,514.
Evans, Bryce B., to Aeroquip Corporation. Eccentricity compensating seal. 3,973,782, Cl. 277-142.000.
Evans, Dennis Ernest Mackley, to Imperial Chemical Industries Limited. Vinyl chloride polymerization process. 3,974,133, Cl. 526-344.000.
Everett Medical Products Limited: *See—*
Steer, Peter, 3,973,565.
Excellon Industries: *See—*
Smith, Joseph E., 3,973,863.
Extel Corporation: *See—*
Fulton, John R., 3,973,662.
Exxon Production Research Company: *See—*
Gatlin, John M.; and Pittman, J. P., 3,973,635.
Hill, Tom H.; and True, Martin E., 3,973,586.
Exxon Research and Engineering Company: *See—*
Bock, Jan; Lundberg, Robert D.; Phillips, Robert R.; and Makowski, Henry S., 3,974,240.
Brumbaugh, Kenneth H.; and McAlpin, James J., 3,974,237.
Lundberg, Robert D.; Phillips, Robert R.; Westerman, Lowell; and Bock, Jan, 3,974,241.
Oswald, Alexis A.; and Barnum, Harry W., 3,974,125.
Porter, Carter E.; Parsons, Richmond S.; and Rossiter, Paul H., 3,973,890.
Rutkowski, Alfred J.; and Szykowski, John P., 3,974,081.
Segura, Marnell A.; Aldridge, Clyde L.; Riley, Kenneth L.; and Pine, Lloyd A., 3,974,096.
Voorhies, Alexis, Jr.; and Hamner, Glen P., 3,974,060.
Wheelock, Kenneth S.; and Aldridge, Clyde L., 3,974,256.
Eyster, Paul J.; and Yanek, Edward J., to Allis-Chalmers Corporation. Runner hub construction for propeller type turbine. 3,973,876, Cl. 416-244.00A.
Ezra C. Lundahl Inc.: *See—*
Lundahl, Ezra Cordell, 3,973,377.
F. J. Littell Machine Company: *See—*
Wiig, Chester M., 3,973,423.
F.T.F.: *See—*
Mollard, Maurice, 3,973,655.
Fahrner, Willard F. Ship connecting structure. 3,973,512, Cl. 114-235.00R.
Fairchild Industries Inc.: *See—*
Weisser, German Louis, 3,973,868.
Falconbridge Nickel Mines Limited: *See—*
Olafsen, Karl D., 3,974,349.
Falconer, David Duncan, to Bell Telephone Laboratories, Incorporated. Joint decision feedback equalization and carrier recovery adaptation in data transmission systems. 3,974,449, Cl. 325-321.000.
Familant, Harold M., to Monsanto Company. Low delivery tension process for producing crimped yarn. 3,973,387, Cl. 57-157.00R.
Farah Manufacturing Company, Inc.: *See—*
Breck, William Louis, Jr.; and Pickle, Jack L., 3,973,658.
Farmer, Ernest Leonard, to Wildt Mellor Bromley Limited. Pattern mechanism. 3,973,415, Cl. 66-50.00B.
Farnum, Roger L.: *See—*
Newton, Albert E.; Farnum, Roger L.; and Gelsomini, Nicholas J., 3,973,284.
Farrow, Max W.: *See—*
Thomas, Frank J.; and Farrow, Max W., 3,974,328.
Farwell, Harry Russell: *See—*
Black, James A.; and Farwell, Harry Russell, 3,973,492.
Black, James A.; and Farwell, Harry Russell, 3,973,493.
Porth, Frank L.; Black, James A.; and Farwell, Harry Russell, 3,973,491.
Fassett, Matthew, to Raytheon Company. Stripline load for airborne antenna system. 3,974,462, Cl. 333-22.00R.
Faul, Wolfgang: *See—*
Divisek, Jiri; Faul, Wolfgang; and Kastening, Bertel, 3,974,050.
Faulkner, Richard Dale; and Tomasetti, Charles Michael, to RCA Corporation. Channel plate electron multiplier tube having reduced astigmatism. 3,974,411, Cl. 313-105.0CM.
Fawcett, Derek James, to Lewmar Marine Limited. Hand operated winch. 3,973,755, Cl. 254-150.00R.
Fedders Corporation: *See—*
Silva, William; and Conrath, Richard L., 3,973,330.
Federmann, Manfred: *See—*
Kurz, Jurgen; Kolling, Heinrich; and Federmann, Manfred, 3,974,204.
Feess, Erich, to Hoechst Aktiengesellschaft. Process and device for drying synthetic fibrous material. 3,973,329, Cl. 34-9.000.
Fehr, Henri; and Carriere, Raymond Lucien, deceased (by Carriere, Jeanne Constance, heiress and legal representative), to Compagnie de Construction Mechanique Sulzer. Asynchronous synchronizable magnetic coupling. 3,974,408, Cl. 310-103.000.
Feldy, Edmund C.: *See—*
De Boo, Jerome L.; Feldy, Edmund C.; and Grear, Horace Stanley, 3,973,661.
Feng, Kuo-Chuan: *See—*
von Smolinski, Alfred; and Feng, Kuo-Chuan, 3,973,911.
Feodor Burgmann Dichtungswerk, Firma: *See—*
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, 3,973,779.
Ferrante, Rafael. Containers for pulverulent and granular products. 3,973,702, Cl. 222-196.500.
Ferrar, Carl M., to United Technologies Corporation. Dispersion compensated laser gyro (U). 3,973,851, Cl. 356-106.0LR.
Ferri, John L.; Mathers, James E.; and Yale, Ramon L., to GTE Sylvania Incorporated. Terbium-activated rare earth oxysulfide X-ray phosphors. 3,974,389, Cl. 250-483.000.
Ferro Corporation: *See—*
Bingham, John Francis, 3,973,982.
Ferro Manufacturing Corporation: *See—*
Pickles, Joseph, 3,973,288.
Fett, Darrell L.; Bird, David A.; and Rauser, Jerry L., to Honeywell Information Systems, Inc. Logic level translator. 3,974,402, Cl. 307-264.000.
Fillion, Stanley Herbert: *See—*
Martin, Albert Edward; and Fillion, Stanley Herbert, 3,973,681.
Filsinger, David E.: *See—*
Pratt, John W., Jr.; and Filsinger, David E., 3,973,707.
Fine, David H., to Thermo Electron Corporation. Method of measuring the N-nitrosoamine content of a sample. 3,973,910, Cl. 23-230.0PC.
Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C.: *See—*
Pozzetti, Mario, 3,973,433.
Firmenich S.A.: *See—*
Buchi, George H.; and Wuest, Hans, 3,974,225.
Fischer, Steven M.: *See—*
Vande Ven, John E.; and Fischer, Steven M., 3,973,440.
Fischer, William H.: *See—*
Dix, Earl E.; and Fischer, William H., 3,973,645.
Fischli, Albert Eduard: *See—*
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, 3,974,185.
Fischman, Martin; and Matarese, John, to GTE Laboratories Incorporated. Contactless ignition system utilizing a saturable core transformer. 3,973,545, Cl. 123-148.0CB.
Fisher, Norman Ernest: *See—*
Walmsley, Robert Edwin; Oliver, Robert; and Fisher, Norman Ernest, 3,973,883.
Fisons Limited: *See—*
Crerar, John David; and Hemsley, John David Crowther, 3,974,262.
Crerar, John David; Hemsley, John David Crowther; and Hepworth, Ian Clive, 3,974,263.
Fitch, Arthur Haines: *See—*
Bondybey, Vladimir Edmund; and Fitch, Arthur Haines, 3,974,016.
Flamand, Paul, to Flamor S.A. Process for making a piece of hollow jewelry. 3,973,716, Cl. 228-118.000.
Flamor S.A.: *See—*
Flamand, Paul, 3,973,716.
Flannery, John B.; and Van Laeken, Anita C., to Xerox Corporation. Photochromic composition containing a diphenyl dibenzochrom-3-ene. 3,973,966, Cl. 96-48.00R.
Fleischhacker, John J.; and Fleischhacker, Joseph F., Jr., to Lake Region Manufacturing Company, Inc. Smoothened coil spring wire guide. 3,973,556, Cl. 128-2.00M.
Fleischhacker, Joseph F., Jr.: *See—*
Fleischhacker, John J.; and Fleischhacker, Joseph F., Jr., 3,973,556.
Fleming, Robert W.; Sill, Arthur D.; and Sweet, Francis W., to Richardson-Merrell Inc. Bis-basic ethers of 2,6- and 2,7-dihydroxyanthraquinones. 3,974,186, Cl. 260-380.000.
Flesselles, Jacques: *See—*
Ginhoux, Louis; and Flesselles, Jacques, 3,973,431.
Fletcher, Walter B.: *See—*
Penn, Franklin E.; Fletcher, Walter B.; Rosa, Edmund; and Perina, Joseph, 3,973,834.
Flocchini, Andrew J. Automated milking assembly. 3,973,520, Cl. 119-14.080.
Florence, Edwin, to Edwin Florence, Limited. Connecting device for panels and tubes. 3,973,855, Cl. 403-171.000.
Flour Milling and Baking Research Association: *See—*
Cauvain, Stanley Peter; Hodge, Donald Gordon; Muir, David Donald; and Dodds, Norman James Harold, 3,974,298.
Fluckiger, Rudolf: *See—*
Rettinghaus, Gerhard; and Fluckiger, Rudolf, 3,974,380.
Flynn, Thomas P.: *See—*
Moore, Lionel G., Jr.; and Flynn, Thomas P., 3,973,935.
Folkers, Karl; and Sievertsson, Hans. Synthetic decapeptide having the activity of the luteinizing hormone releasing hormone and method for producing the same. 3,974,135, Cl. 260-112.5LH.
Folkers, Karl: *See—*
Wan, Yieh-Ping; and Folkers, Karl, 3,974,187.
Fooladi, Mike Mehdi. Two-component catalyst for the production of side chain halogen substitution products of aromatic compounds. 3,974,093, Cl. 252-429.00R.
Forch, Hans: *See—*
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, 3,973,779.
Ford Motor Company: *See—*
Uy, James C., 3,974,309.

Forenade Fabriksverken: *See*—
Hallqvist, Ernst Bernhard, 3,973,392.

Forschirm, Alex S., to Celanese Corporation. Dyeing of halogenated aromatic polyester fibrous materials with dimethylterephthalate. 3,973,907, Cl. 8-172.00R.

Foster, John; and Ahir, Vallabhbhai Bhanabhai, to Amalgamated Dental Company Limited, The. Denture bases of X-ray opaque polymers. 3,974,104, Cl. 252-478.000.

Foster Wheeler Energy Corporation: *See*—
Bow, William James; and Bernstein, Martin David, 3,973,621.

Fowler, Gene Roger: *See*—
Knollman, Melvin Louis; Cornish, George Kent; and Fowler, Gene Roger, 3,973,380.

Fox, Ronald Denis: *See*—
Garrett, Kenneth John; and Fox, Ronald Denis, 3,973,651.

Fox, William B.: *See*—
Eibeck, Richard E.; Fox, William B.; and Sukornick, Bernard, 3,974,265.

Fraczek, Kazimerz: *See*—
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.

Francel, Josef; King, James E.; and Woulbroun, John M., to Owens-Illinois, Inc. PbO-containing sealing glass with higher oxide of a cation to avoid PbO reduction. 3,973,975, Cl. 106-53.000.

Francke, Robert L.: *See*—
Nyitray, William; and Francke, Robert L., 3,973,758.

Frank Storimans Limited: *See*—
Storimans, Franciscus Jozef A., 3,973,457.

Frank W. Murphy Manufacturer, Inc.: *See*—
Sparks, Buddy G.; and Carlton, Lewis M., 3,973,550.

Frankel, Hugh, to Multi-Slide Corporation Ltd. Multi-image slide mount. 3,973,344, Cl. 40-158.00B.

Fransen, Jan Josephus Bernardus: *See*—
Van Bakel, Adrianus Maria; Fransen, Jan Josephus Bernardus; and Kuiper, Adrianus, 3,973,816.

Franz, Henry H. Control for filling flexible bottles or containers. 3,973,603, Cl. 141-114.000.

Free, Dustin L., to Dow Chemical Company, The. Fracturing subterranean formation. 3,974,077, Cl. 252-8.55R.

Fremlin, John E., to Fremlin, Ronald H.; and Fremlin, Robert E. Hydraulic injection engine. 3,973,470, Cl. 91-413.000.

Fremlin, Robert E.: *See*—
Fremlin, John E., 3,973,470.

Fremlin, Ronald H.: *See*—
Fremlin, John E., 3,973,470.

Frenken, Hans; Schindler, Georg; and Kramer, Horst, to AGFA-Gevaert, A.G. Method of and an apparatus for filling membrane cassettes. 3,973,310, Cl. 29-156.40R.

Fridkin, Matityahu: *See*—
Patchornik, Abraham; Kalir, Rami; Fridkin, Matityahu; and Warshavsky, Abraham, 3,974,110.

Fridrich, Elmer G., to General Electric Company. Fluorescent lamp unit with ballast resistor and cooling means therefor. 3,974,418, Cl. 315-59.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Busch, Carl Wilheim; and Stedtnitz, Wolfgang, 3,974,473.

Friedheim, Ernst A. H. Filaricidal and trypanocidal phenylarsenodithio compounds. 3,974,148, Cl. 260-242.000.

Friedl, Franz; Kohler, Erich; Holler, Hans; and Gebauer, Franz, to Semperit Aktiengesellschaft. Hollow formwork elements for producing concrete structures. 3,973,749, Cl. 249-65.000.

Friend, Aaron D.; and Lindahl, Hilmer C., to R. G. LeTourneau, Inc. Propulsion control system for electrically powered vehicles. 3,974,429, Cl. 318-350.000.

Froberg, Tord Egron Henry: *See*—
Gustafsson, John Harry; and Froberg, Tord Egron Henry, 3,973,594.

Frohberger, Paul-Ernst: *See*—
Buchel, Karl Heinz; Kramer, Wolfgang; and Frohberger, Paul-Ernst, 3,974,174.

Frohner, Klaus; and Panahandeh, Hossein, to Gesellschaft fur Kernenergieverwertung in Schiffbau und Schiffahrt mbH. Addition of finely divided $BaSO_4$ particles to sea water for removal of scale components. 3,974,039, Cl. 203-7.000.

Frost, Lawrence, to Alvey Inc. Article conveying and orienting apparatus. 3,973,672, Cl. 198-283.000.

Fuchs, Heinz, to Micafil A.G. Electrical insulation particularly for use in winding slots of dynamo-electric machines and method for its manufacture. 3,974,314, Cl. 428-212.000.

Fuchs, Julius Jakob; and Lin, Kang, to Du Pont de Nemours, E. I., and Company. 1,3,5-Triazinediones and their use as selective herbicides. 3,973,947, Cl. 71-93.000.

Fuji Photo Film Co., Ltd.: *See*—
Shiba, Keisuke; Hinata, Masanao; Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, 3,973,969.
Tadokoro, Eiichi; and Kitamoto, Tatsuji, 3,973,920.
Yanagihara, Kazuhiko; and Takeda, Hideo, 3,973,437.

Fujino, Akiharu; Iwataki, Isao; and Hirono, Yoshihiko, to Nippon Soda Company Ltd. Pyran-2,4-dione derivatives. 3,973,945, Cl. 71-88.000.

Fujita, Tatsu; Kawakami, Heijiro; Yamada, Yoshiro; and Yamada, Tetsuo, to Kobe Steel Limited. Method of cooling steel wire. 3,973,426, Cl. 72-286.000.

Fujitsu Ltd.: *See*—
Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, 3,974,000.

Fujiwhara, Mitsuto; Matsuo, Syunji; and Kojima, Tamotsu, to Konishiroku Photo Industry Co., Ltd. Photographic acyl acetanilide color couplers with 2,5-dioxo-1-imidazolidinyl coupling off groups. 3,973,968, Cl. 96-56.500.

Fukatsu, Motonori; and Nakano, Tatsumi, to Akai Electric Company Limited. Electronic editing method and apparatus for a video tape recorder. 3,974,522, Cl. 360-14.000.

Fukuda, Atsushi: *See*—
Takahashi, Akio; Fukuda, Atsushi; and Igarashi, Toshio, 3,974,045.

Fukuhara, Seiji: *See*—
Nakamura, Ryuichi; Fukuhara, Seiji; Matsumoto, Shuichi; and Komatsu, Koei, 3,974,196.

Fuller, Willard A., to Hooker Chemicals & Plastics Corporation. Production of chlorine dioxide. 3,974,266, Cl. 423-478.000.

Fulton, John R., to Extel Corporation. Acceleration control system for high speed printer. 3,973,662, Cl. 197-1.00R.

Furchner, Helmut; and Stroiazzo, Bernard. Process and installation for creating optimum climatic conditions in a room by air purification and ionization control. 3,973,927, Cl. 55-4.000.

Furukawa Electric Co., Ltd., The: *See*—
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, 3,974,467.

Furuya, Teruo; Suzuki, Jun; and Tanimoto, Michio, to Hitachi, Ltd. Wire bonding system. 3,973,713, Cl. 228-102.000.

G.A.O. Gesellschaft fur Automation und Organisation m.b.H.: *See*—
Hamann, Walter; and Maurer, Thomas, 3,974,379.

G. D. Searle & Co.: *See*—
Markos, Charles S., 3,974,143.

Gabriel of Canada Limited: *See*—
Patriquin, William George, 3,973,654.

Gadekar, Shreekrishna M., to Affiliated Medical Research, Inc. 5-Methyl-1-phenyl-2-(1H)-pyridone compositions and methods of use. 3,974,281, Cl. 424-263.000.

Gadsby, Brian: *See*—
Cross, Peter Edward; and Gadsby, Brian, 3,974,155.

GAF Corporation: *See*—
Lanahan, John H.; and Abraham, William W., 3,974,361.

Gaglioti, Joseph. Manhole closure assembly. 3,973,856, Cl. 404-25.000.

Galerkin, Jury Borisovich: *See*—
Seleznev, Konstantin Pavlovich; Galerkin, Jury Borisovich; Strizhak, Leonid Yakovlevich; and Zuev, Anatoly Vasilievich, 3,973,872.

Galka, John Joseph: *See*—
Bieber, Clarence George; Mihalisin, John Raymond; and Galka, John Joseph, 3,973,952.

Gallacher, John David; Nevrkla, Johann Leopold; and Judd, David Walter. Direct readout distance measuring device. 3,973,326, Cl. 33-125.00R.

Gansert, Willi: *See*—
Jakob, Gert; and Gansert, Willi, 3,973,477.

Gardella, Adriano. Selvedge-forming device in shuttleless weaving looms. 3,973,597, Cl. 139-431.000.

Gardner, Jack C., to Glasrock Products, Inc. Foam generating and dispensing device. 3,973,701, Cl. 222-190.000.

Garner, Robert; and Petitpierre, Jean Claude, to Ciba-Geigy AG. Nitro-chromeno pyrazole compounds their manufacture and use. 3,974,175, Cl. 260-310.00R.

Garrett Corporation, The: *See*—
Dix, Earl E.; and Fischer, William H., 3,973,645.

Garrett, Kenneth John; and Fox, Ronald Denis, to Humphrey Thompson Enterprises Limited. Vehicle chock. 3,973,651, Cl. 188-32.000.

Gates Rubber Company, The: *See*—
Stuemky, Robert E., 3,973,411.

Gatlin, John M.; and Pittman, J. P., to Exxon Production Research Company. Method and apparatus for offshore drilling operations. 3,973,635, Cl. 175-7.000.

Gavich, Valery Timofeevich: *See*—
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kusheley, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.

Gavin, Derek Gabriel, to Price-Pearson Refractories Limited; and British Gas Corporation. Catalysts of nickel and uranium. 3,974,098, Cl. 252-443.000.

Gawlick, Heinz: *See*—
Brede, Uwe; and Gawlick, Heinz, 3,973,500.

GCA Corporation: *See*—
Giammanco, Rosario P., 3,973,665.

Gebauer, Franz: *See*—
Friedl, Franz; Kohler, Erich; Holler, Hans; and Gebauer, Franz, 3,973,749.

Gebr. Batz, Firma: *See*—
Buhr, Hermann, deceased, 3,973,301.

Gebr. Heller, Firma: *See*—
Klose, Ernst, 3,973,319.

Gehlert, Rolf; and Winkler, Friedrich, to AGFA-Gevaert, A.G. Motion picture camera with dissolve mechanism. 3,973,841, Cl. 352-91.00C.

Geis, David G.: *See*—
Bleeker, George H.; and Geis, David G., 3,974,489.

Geisler, Donald R.: *See—*
Ward, Bennie R.; and Geisler, Donald R., 3,973,921.

Geiszler, Adolph Oscar, to Abbott Laboratories. N,N'-bis-(6-amino)-4,4-hexamethylenediamino quinaldine dihydrochloride as an anti-L-1210 lymphoid and P388 lymphocytic leukemia agent. 3,974,279, Cl. 424-258.000.

Gelsomini, Nicholas J.: *See—*
Newton, Albert E.; Farnum, Roger L.; and Gelsomini, Nicholas J., 3,973,284.

General American Transportation Corporation: *See—*
Saigh, Philip A.; Glueckert, Albert J.; Budininkas, Pranas; and Caldwell, Joseph, Jr., 3,974,075.

General Binding Corporation: *See—*
Staats, Henry N.; and Newcomb, Robert K., 3,973,787.

General Electric Company: *See—*
Abbott, Roy W., 3,973,939.
Arnold, Richard B.; and Straley, Larry W., 3,973,601.
Ashby, Bruce A., 3,974,198.
Collins, Byron R.; and McVey, Charles I., 3,974,410.
Cooper, Glenn D.; and Abolins, Visvaldis, 3,974,235.
Corsmeier, Robert J.; and Koff, Bernard L., 3,973,874.
Dochterman, Richard W., 3,974,407.
Fridrich, Elmer G., 3,974,418.
Girard, Roland T.; Rice, George A.; and DeTommasi, Arthur N., 3,974,304.
Izzo, Louis M., 3,974,474.
Lupinski, John H.; and McQuade, James M., 3,974,324.
Pearson, Donald L., 3,974,370.
Razzano, John S.; and Simpson, Verne G., 3,974,120.
Van Sorge, Bernardus J., 3,974,229.

General Foods Corporation: *See—*
Parliment, Thomas Holden, 3,974,197.

General Motors Corporation: *See—*
Berg, Alan D., 3,973,799.
Colenutt, Brian Frank, 3,973,728.
Craig, Gale M., 3,974,413.
Gould, Robert R., Jr., 3,974,472.
Kokochak, David G., 3,973,526.
Long, George B., 3,974,354.
Rogers, Lloyd W., Jr., 3,973,786.
Winchell, Frank J., 3,973,882.

General Refractories Company: *See—*
Staut, Ronald; and Morgan, Peter E. D., 3,974,108.

General Resource Corporation: *See—*
Kwon, Sung Lim; and Pausch, Josef, 3,973,802.

George, Brian Victor; and Cook, Reginald Kenneth, to Nuclear Power Company (Whetstone) Limited. Nuclear reactors with auxiliary boiler circuit. 3,974,029, Cl. 176-60.000.

George, Clifford L.: *See—*
Cross, Thomas R.; and George, Clifford L., 3,973,769.

Georgopoulos, Christos J., to Raytheon Company. Digital data transmission system. 3,974,403, Cl. 307-270.000.

Gerlach, Klaus; Pitowski, Hans Jurgen; and Schneider, Klaus, to Akzo N.V. of Arnhem, Holland. Synthetic leather product and method of production. 3,974,320, Cl. 428-283.000.

Gernelle, Francois. Data processing system, specially for real-time applications. 3,974,480, Cl. 340-172.500.

Gesellschaft fur Kernenergieverwertung in Schiffbau und Schiffahrt mbH: *See—*
Frohner, Klaus; and Panahandeh, Hossein, 3,974,039.

Ghisler, Walter, to L.M. Ericsson Pty Ltd. Data switching apparatus and method. 3,974,340, Cl. 179-15.0AT.

Giammanco, Rosario P., to GCA Corporation. Article delivery and transport apparatus for evacuated processing equipment. 3,973,665, Cl. 198-19.000.

Giffen, Herbert F. Sink shampoo unit. 3,973,279, Cl. 4-159.000.

Giglia, Robert Domenico, to American Cyanamid Company. Electrochromic devices with partially pre-charged counterelectrodes. 3,973,829, Cl. 350-160.00R.

Gilbert Associates Inc.: *See—*
Switzer, George W., 3,973,733.

Gilbo, Charles F.; and Glassman, Alan S., to Armstrong Cork Company. Connectors for tubular framing members. 3,973,854, Cl. 403-170.000.

Gill, Robert C.: *See—*
McCulloch, Charles R.; and Gill, Robert C., 3,973,510.

Gillette Company, The: *See—*
Block, Ira Jordan; and Sokol, Phillip Edward, 3,974,128.

Gilliland, Ralph Wilson, to Illinois Tool Works Inc. Brush contact. 3,974,471, Cl. 338-202.000.

Gilliom, John W.: *See—*
Caselani, Richard E.; Gilliom, John W.; McFarland, Robert H.; and Perl, Richard L., 3,973,551.

Gimac S.p.A.: *See—*
Torazzi, Franco, 3,973,632.

Gingras, Richard P. In-line energization and de-energization of an external load in series with an external source of electricity in response to externally sensed parameters. 3,974,426, Cl. 317-132.000.

Ginhoux, Louis; and Flesselles, Jacques, to CGEE Alsthom; and Service d'Exploitation Industrielle des Tabacs et des Allumettes. Device for the rapid measuring of the degree of humidity of substances. 3,973,431, Cl. 73-76.000.

Girard, Roland T.; Rice, George A.; and DeTommasi, Arthur N., to General Electric Company. Method of making a voltage responsive switch. 3,974,304, Cl. 427-58.000.

Girismen, Fahir. Alarm system. 3,974,492, Cl. 340-280.000.

Girling Limited: *See—*
Bate, Anthony John, 3,973,473.
Heibel, Helmut; and Thielecke, Jorg, 3,973,578.
Reynolds, Desmond Henry James; and Yardley, Alfred, 3,973,401.

Girodin, Mario. Combustion engine with reduced emissions. 3,973,394, Cl. 60-39.630.

Givaudan Corporation: *See—*
Bertele, Erhard; and Schudel, Peter, 3,974,226.
Lamparsky, Dietmar; and Schudel, Peter, 3,974,222.

Glasrock Products, Inc.: *See—*
Gardner, Jack C., 3,973,701.

Glass, Marvin I.; Barlow, Gordon A.; and Licitis, Gunars, to Marvin Glass & Associates. Game apparatus. 3,973,773, Cl. 273-94.00R.

Glassman, Alan S.: *See—*
Gilbo, Charles F.; and Glassman, Alan S., 3,973,854.

Glaverbel-Mecaniver: *See—*
Jacquemin, Francis; Terneu, Robert; and Voiturier, Jean-Pierre, 3,974,316.

Glaxo Laboratories Limited: *See—*
Cook, Martin Christopher; and Laundon, Brian, 3,974,150.
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 3,974,153.
Weir, Niall Galbraith, 3,974,152.

Glick, Allan, to Lawrence Peska Associates, Inc., a part interest. Safety cap for container. 3,973,687, Cl. 215-207.000.

Globe Tool and Engineering Company, The: *See—*
Miller, Jerry E., 3,973,738.

Glockner, Hans: *See—*
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, 3,973,979.

Gloye, Eugene E.: *See—*
Marcus, Rudolph J.; and Gloye, Eugene E., 3,973,466.

Glueckert, Albert J.: *See—*
Saigh, Philip A.; Glueckert, Albert J.; Budininkas, Pranas; and Caldwell, Joseph, Jr., 3,974,075.

Glyzdov, Igor Mitrofanovich: *See—*
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.

Godfrey, Graham: *See—*
Trueman, Roy; Warsop, Colin; Godfrey, Graham; and Prestidge, John Malcolm, 3,974,341.

Goeke, Eberhard: *See—*
Staege, Hermann; and Goeke, Eberhard, 3,973,923.

Goens, Duane N.; and Reynolds, James E., to Cyprus Metallurgical Processes Corporation. Zinc recovery by chlorination leach. 3,973,949, Cl. 75-112.000.

Gogarty, William B.: *See—*
Knight, Bruce L.; Rhudy, John S.; and Gogarty, William B., 3,973,629.

Gokhale, Sudarshan D., to BASF Wyandotte Corporation. Ruthenium coated cathodes. 3,974,058, Cl. 204-266.000.

Goldfischer, Lester I., to Singer Company, The. Velocity sensing apparatus. 3,974,500, Cl. 343-8.000.

Golladay, James D.; and Abler, Norman C., to Bunker Ramo Corporation. Apparatus for producing patterned deep pile circular knitted fabrics. 3,973,414, Cl. 66-9.00B.

Goltsos, Costas E., to Teckton, Inc. Conveyorized microwave oven. 3,974,353, Cl. 219-10.55A.

Goltsos, Costas E., to Teckton, Inc. Portable food heating device. 3,974,358, Cl. 219-387.000.

Golub, Samuel G.; and Klagges, Charles E., to Graham-Field Surgical Co., Inc. Socket clamp. 3,973,819, Cl. 339-209.000.

Goncharov, Evgeny Andreevich: *See—*
Marbukh, Veniamin Anatolievich; Lychak, Veniamin Samuilovich; and Goncharov, Evgeny Andreevich, 3,974,393.

Gonner, Winfried Karl, to Bodenseewerk Perkin-Elmer & Co. GmbH. Connecting device for connecting chromatographic separating columns of glass. 3,973,792, Cl. 285-341.000.

Goode, John V., Jr.: *See—*
Moore, Zack J.; and Goode, John V., Jr., 3,973,852.

Goransson, Rolf Erik, to Internationella Siporex Aktiebolaget. Lifting device for handling cut cellular concrete bodies. 3,973,795, Cl. 294-65.000.

"Gorenje" tovarna gospodinjske opreme: *See—*
Suhel, Peter, 3,973,571.

Gorini, Robert F.: *See—*
Babson, Edward S.; and Gorini, Robert F., 3,973,285.

Gorrafa, Adly Abdel-moniem, to Du Pont de Nemours, E. I., and Company. Process for texturing polyester yarn. 3,973,386, Cl. 57-157.0TS.

Gotz, Hans, to Daimler-Benz Aktiengesellschaft. Air deflection for sliding roofs of motor vehicles. 3,973,478, Cl. 98-2.140.

Goulay, Jean, to Choay S.A. Process for directly obtaining the calcium and magnesium salts of the N-acetyl-amino-6-hexanoic acid from acetyl-caprolactame. 3,974,215, Cl. 260-534.00R.

Gould Inc.: *See—*
Blumenthal, John, 3,974,508.

Gould, Robert R., Jr., to General Motors Corporation. Domestic appliance control and display panel. 3,974,472, Cl. 340-337.000.

Govignon, Jacques P., to Varian Associates. Reduced glare scanner. 3,973,836, Cl. 351-7.000.

Graham-Field Surgical Co., Inc.: *See—*
Golub, Samuel G.; and Klagges, Charles E., 3,973,819.

Grahame, Robert E., Jr.: *See*—
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 3,974,287.

Gralak, Bruce G., to Quaker Oats Company, The. Process for preparing protein supplemented, flavored instant grits. 3,974,295, Cl. 426-72.000.

Graml, Josef. Inflation sealing device for tubeless tires for motor vehicles. 3,974,005, Cl. 157-1.100.

Grandchamp, Pierre-Andre: *See*—
Burckhardt, Christoph Benedikt; Grandchamp, Pierre-Andre; and Hoffmann, Heinz, 3,974,475.

Grane, Henry R.: *See*—
Worrell, G. Richard; Hirsig, Alan R.; and Grane, Henry R., 3,974,214.

Granges Essen Aktiebolag: *See*—
Roos, Erling, 3,974,013.

Grassme, Ulrich: *See*—
Bronner, Karlheinz; Grassme, Ulrich; and Soder, Eickhardt, 3,974,387.

Grauer, William B.: *See*—
Huber, John G.; and Grauer, William B., 3,973,859.

Gravi-Mechanics Co.: *See*—
Dedolph, Richard R., 3,973,353.

Gray, George William; Harrison, Kenneth John; Hulme, David Sanderson; and Raynes, Edward Peter, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Liquid crystal compositions. 3,974,087, Cl. 252-299.000.

Grayson, Martin: *See*—
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 3,974,083.

Grear, Horace Stanley: *See*—
De Boo, Jerome L.; Feldy, Edmund C.; and Grear, Horace Stanley, 3,973,661.

Greco, Giovanni; and Tomassini, Maurizio. Method for the production of semiconductor devices with an integral heatsink and of related semiconductor equipment. 3,973,320, Cl. 29-578.000.

Greco, Nicholas P.; and Webb, David A., to Koppers Company, Inc. Method for preparing an improved creosote wood preservative from a coal tar creosote. 3,973,971, Cl. 106-15.00R.

Green, Leonard. Interior door latch assembly. 3,973,794, Cl. 292-254.000.

Green, Norman F.: *See*—
Dietiker, Paul; and Green, Norman F., 3,973,576.

Green, Percy; Kordecki, Margaret Cook; and Lipman, Roger David Arnold, to Johnson & Johnson. Adhesive bandage backings. 3,973,563, Cl. 128-156.000.

Greenbaum, Sheldon B.: *See*—
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,974,277.

Greer, James E., to Burlington Industries, Inc. Apparatus for thermosol dyeing of polyester fabrics. 3,973,417, Cl. 68-19.100.

Gregory, Gordon Ian: *See*—
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 3,974,153.

Greve, Heinz, to Hauni-Werke Korber & Co., KG. Method and apparatus for the production of filter rod sections or the like. 3,974,007, Cl. 156-64.000.

Griffith, Glen R.; and Deutsch, Ralph, to Nippon Gakki Seizo Kabushiki Kaisha. Key switch scanning and encoding system. 3,974,478, Cl. 340-166.00R.

Griffith, Russell K.; and Jones, John F., to Standard Oil Company. Manufacture of impact-resistant olefinic-nitrile copolymers. 3,974,239, Cl. 260-879.000.

Griffiths, Donald E.; and Pugliese, Carl F., to International Business Machines Corporation. Magnetic storage apparatus employing flexible record disks with peripheral disk-identification means. 3,974,524, Cl. 360-75.000.

Grim, Stig, to Siemens Aktiengesellschaft. X-ray diagnostic apparatus. 3,974,385, Cl. 250-402.000.

Grorich, Kurt, to VEB Gummikombinat Berlin. Self-lubricating seal. 3,973,781, Cl. 277-134.000.

Groshans, Joseph R., to Chicago Pneumatic Tool Company. Sanding shoe. 3,973,362, Cl. 51-386.000.

Gross, David A.: *See*—
Kotok, Alan; Kent, Allan R.; and Gross, David A., 3,974,479.

Groupement pour les Activities Atomiques et Avancees "GAAA": *See*—
Le Frere, Jean-Paul, 3,973,878.

Gruhier, Henri: *See*—
Dezael, Claude; Deschamps, Andre; and Gruhier, Henri, 3,974,257.

Grumman Aerospace Corporation: *See*—
Huber, John G.; and Grauer, William B., 3,973,859.

Grzywa, Edward: *See*—
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.

Gschaider, Werner: *See*—
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.

GTE Laboratories Incorporated: *See*—
Fischman, Martin; and Matarese, John, 3,973,545.

GTE Sylvania Incorporated: *See*—
Buescher, William E.; and Kerstetter, Donald R., 3,974,414.

Cheney, Richard F.; Moscatello, Charles L.; and Mower, Frederick J., 3,974,245.

Ferri, John L.; Mathers, James E.; and Yale, Ramon L., 3,974,389.

Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 3,973,948.

Mager, Eric L., 3,973,691.

Gubarev, Viktor Georgievich: *See*—
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Gubela, Hans-Erich. Light reflector plate and method of fabrication. 3,973,342, Cl. 40-136.000.

Guder, Gottfried: *See*—
Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 3,973,960.

Guha, Dwipendra Nath, to Avnet, Inc. Cueing control. 3,973,777, Cl. 274-23.00R.

Gulf Oil Corporation: *See*—
Cahoy, Roger P., 3,974,223.

Gulf Research & Development Company: *See*—
Cahoy, Roger P., 3,974,218.

Gulistan, Bulent, to Deutsch Fastener Corporation. Arrangement for removal of captive fastener. 3,973,317, Cl. 29-427.000.

Gustafsson, John Harry; and Froberg, Tord Egron Henry, to IFO AB. Mixing valve. 3,973,594, Cl. 137-637.000.

Gwyn, John E.: *See*—
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., 3,974,091.

Gygax, Hans-Rudolf; and Peregi, Gyorgy, to Swiss Aluminium Ltd. Production of graphic patterns. 3,973,847, Cl. 355-85.000.

Haberkorn, Robert W.: *See*—
Naley, Lowell B.; Haberkorn, Robert W.; and Leinum, Virgil D., 3,973,618.

Hacke, Walter: *See*—
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,974,277.

Haensel, Dietrich: *See*—
Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringleben, Hans; and Knabel, Walter, 3,974,011.

Hafle, Ralph S., to Baldwin Electronics, Inc. Wide range, high accuracy, electronically programmed speed control system. 3,974,428, Cl. 318-314.000.

Hait, Larry G.: *See*—
Crouch, Thomas J.; and Hait, Larry G., 3,974,445.

Hallett, Geoffrey D.: *See*—
Pelletier, Albert; and Hallett, Geoffrey D., 3,973,761.

Hallmark Cards, Incorporated: *See*—
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., 3,974,014.

Hallqvist, Ernst Bernhard, to Forenade Fabriksverken. Pressure propellant generating system. 3,973,392, Cl. 60-39.480.

Hamada, Masa: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,973,608.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,974,184.

Hamann, Walter; and Maurer, Thomas, to G.A.O. Gesellschaft fur Automation und Organisation m.b.H. Electromechanical timing pulse generator. 3,974,379, Cl. 250-233.000.

Hammann, Ingeborg: *See*—
Hoffmann, Hellmut; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,974,171.

Hammerli, Martin; and Butler, John P., to Atomic Energy of Canada Limited. Apparatus and method of producing heavy water involving catalytic-electrolytic exchange processes. 3,974,048, Cl. 204-101.000.

Hammond Corporation: *See*—
Schreier, Wilford R., 3,973,463.

Hamner, Glen P.: *See*—
Voorhies, Alexis, Jr.; and Hamner, Glen P., 3,974,060.

Hance, Pierre G., to Ateliers de Constructions Electriques de Charlerol (ACEC). Sump pump. 3,973,871, Cl. 415-198.00R.

Handford Boot Patents Pty. Ltd.: *See*—
Boot, Phillip Handford; and Ellen, Peter Edgington, 3,973,365.

Hanyu, Susumu: *See*—
Eguchi, Yasukata; and Hanyu, Susumu, 3,973,508.

Hardy, Donald F., to Dart Industries Inc. Ware orientation or transfer apparatus. 3,973,666, Cl. 198-24.000.

Hardy, William C.; Schultze, Edward F.; and Shepard, John C., to Sun Oil Company (Delaware). Wellbore gravel pack method. 3,973,627, Cl. 166-276.000.

Harjes, Clarence F.; Leach, Harry W.; and Trp, John M., to CPC International Inc. Low D.E. starch hydrolysates of improved stability prepared by enzymatic hydrolysis of dextrins. 3,974,032, Cl. 195-31.00R.

Harjes, Clarence F.; and Wermers, Vilas L., to CPC International Inc. Malto-dextrins of improved stability prepared by enzymatic hydrolysis of oxidized starch. 3,974,033, Cl. 195-31.00R.

Harnisch, Heinz: *See*—
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.

Harnsberger, Bobby G., to Texaco Inc. Method of forming high load self-cleaning helical spring filters. 3,973,311, Cl. 29-163.5CW.

Harrewijne, Arend: *See—*
Poolman, Petrus Jacobus; Abdalla, Nabil Ahmed; and Harrewijne, Arend, 3,974,054.

Harris, Bernard: *See—*
Butzow, Neil W.; and Harris, Bernard, 3,974,009.

Harris Corporation: *See—*
Sanders, Thomas J.; Davis, Jacob A.; and Morcom, William R., 3,974,517.

Harrison, Kenneth John: *See—*
Gray, George William; Harrison, Kenneth John; Hulme, David Sanderson; and Raynes, Edward Peter, 3,974,087.

Harshaw Chemical Company, The: *See—*
Owen, James E.; and Vogt, J. William, 3,974,089.

Harte, William Joseph. Manual self-teaching apparatus. 3,973,331, Cl. 35-9.00R.

Hartmann, Clinton S.: *See—*
Wagers, Robert S.; and Hartmann, Clinton S., 3,974,464.

Hartwig, Horst: *See—*
Weber, Otto; Hartwig, Horst; and Munchenberg, Gunter, 3,973,653.

Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, to Canon Kabushiki Kaisha. Image recording member with zeolitic water containing compounds. 3,974,041, Cl. 204-2.000.

Hashimoto, Mitsuru, to Ricoh Co., Ltd. (7-Nitro-2-aza-9-fluorenylidene) malononitrile. 3,974,167, Cl. 260-294.900.

Hasler AG: *See—*
Rosdolsky, Hans G.; and Meyr, Heinrich, 3,974,326.

Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., to Southwire Company; and National Steel Corporation. Bridge crane with load cells for correlating the lift operation. 3,973,679, Cl. 212-18.000.

Hauni-Werke Korber & Co., KG: *See—*
Greve, Heinz, 3,974,007.
Schwenke, Dieter, 3,973,671.

Hawker Siddeley Dynamics Engineering Limited: *See—*
Thompson, Lionel Raymond Frank, 3,974,432.

Hayashi, Torahiko. Apparatus for forming dough pieces. 3,973,895, Cl. 425-372.000.

Hayashi, Yoshimasa: *See—*
Sugihara, Kunihiko; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 3,973,535.

Haynes, Royce: *See—*
Trafton, John E.; Nichols, Philip E.; and Haynes, Royce, 3,973,912.

Hazaka, Yuzi: *See—*
Minagawa, Toyosaku, deceased; Hazaka, Yuzi; and Umezawa, Fumio, 3,973,574.

Heap, Nicholas; and Nemcek, Jozef, to Imperial Chemical Industries Limited. Photopolymerizable compositions containing triketone/alcohol adducts as photosensitizers. 3,974,052, Cl. 204-159.150.

Heap, Nicholas: *See—*
Nemcek, Josef; and Heap, Nicholas, 3,974,053.

Heath, Vernon Ernest. Model aircraft wing construction jig. 3,973,766, Cl. 269-43.000.

Hebenstreit, Ernst, to Siemens Aktiengesellschaft. Integrated, programmable logic arrangement. 3,974,366, Cl. 235-152.000.

Hefetz, Uriel. Method and device for extinguishing fires in oil wells. 3,973,631, Cl. 169-46.000.

Hehl, Karl. Die closing unit for injection molding machine with molding die having multiple transfer sections. 3,973,888, Cl. 425-125.000.

Heibel, Helmut; and Thielecke, Jorg, to Girling Limited. Tandem control valve. 3,973,578, Cl. 137-87.000.

Heimann GmbH: *See—*
Kunze, Claus, 3,974,415.

Heinrich Frings, Firma: *See—*
Ebner, Heinrich; and Enenkel, Anton, 3,974,068.

Heiss, Lorenz; and Hille, Martin, to Hoechst Aktiengesellschaft. Quaternary ammonium corrosion inhibitor and petroleum demulsifier. 3,974,220, Cl. 260-569.60P.

Heller, Stephen M. Furniture and wall structural system. 3,973,371, Cl. 52-758.00H.

Hempelmann, Willi: *See—*
Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringleben, Hans; and Knabel, Walter, 3,974,011.

Hemsley, John David Crowther: *See—*
Crerar, John David; and Hemsley, John David Crowther, 3,974,262.
Crerar, John David; Hemsley, John David Crowther; and Hepworth, Ian Clive, 3,974,263.

Henderson, James R., to Controls Southeast, Inc. Jacket construction for fluid flow fittings. 3,973,585, Cl. 137-340.000.

Henig, Hans. Electro plating barrel. 3,974,057, Cl. 204-213.000.

Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, to Fujitsu Ltd. Semi-hard magnetic materials. 3,974,000, Cl. 148-31.550.

Henriksson, Erik: *See—*
Bratthall, Lars; Henriksson, Erik; and Ingesson, Lars Olof, 3,973,624.

Henriksson, Sten Tycho, to Boliden Aktiebolag. Method for the purification of selenium by precipitation from a melt. 3,973,917, Cl. 23-293.00R.

Hentschel, Volkmar, to Braunschweigische Maschinenbauanstalt. Continuously operable sugar centrifuge. 3,973,984, Cl. 127-19.000.

Hepworth, Ian Clive: *See—*
Crerar, John David; Hemsley, John David Crowther; and Hepworth, Ian Clive, 3,974,263.

Hermans, Peter: *See—*
van der Goot, Antonie Sijtze; and Hermans, Peter, 3,974,416.

Herrmann, Albert: *See—*
Schiemann, Heinz; Herrmann, Albert; and Kleen, Gerhard, 3,974,440.

Hertel, Otto: *See—*
Endres, Horst; Hertel, Otto; and Miller, Franz-Friedrich, 3,973,904.

Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., to Pfizer Inc. 13,14-Dihydro-15-substituted-ω-pentanorprostaglandins. 3,974,213, Cl. 260-520.00B.

Hess, Hans-Jurgen E.: *See—*
Althuis, Thomas H.; Czuba, Leonard J.; Hess, Hans-Jurgen E.; and Kadin, Saul B., 3,974,161.

Hester, Sam R. Pneumatic pressure monitoring system. 3,974,477, Cl. 340-58.000.

Hetfleje, Jiri: *See—*
Volpin, Mark Afimovic; Hetfleje, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.

Hewitt, David Edward; and Dando, Thomas Joseph, to Data General Corporation. Water recycle treatment system for use in metal processing. 3,973,987, Cl. 134-12.000.

Hewlett-Packard Company: *See—*
Miller, Leo S.; and Wenninger, Freddie W., 3,974,523.

Hicks, Alan: *See—*
Morrison, Howard J.; Hicks, Alan; and Kuna, Wayne A., 3,973,494.

Higashi, Fukuji: *See—*
Yamazaki, Noboru; and Higashi, Fukuji, 3,974,219.

Higgins, Jerry Gene: *See—*
Teer, Glenn Edward; Higgins, Jerry Gene; and Warren, George D., 3,974,119.

Higo, Moriaki: *See—*
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, 3,974,188.

Hill, Kurt: *See—*
Woditsch, Peter; Hill, Kurt; Hund, Franz; and Rodi, Fritz, 3,974,079.

Hill, Tom H.; and True, Martin E., to Exxon Production Research Company. Velocity-tubing pressure actuated subsurface safety valve. 3,973,586, Cl. 137-460.000.

Hille, Martin: *See—*
Heiss, Lorenz; and Hille, Martin, 3,974,220.

Hilti Aktiengesellschaft: *See—*
Scotoni, Ralph, 3,973,708.

Hinata, Masanao: *See—*
Shiba, Keisuke; Hinata, Masanao; Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, 3,973,969.

Hintzman, Roland D., to Sargent Industries, Inc. Latching mechanism. 3,973,744, Cl. 244-137.00P.

Hirabayashi, Kazuyoshi: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.

Hirai, Hironori. Yarn guide device for an open-end spinning machine. 3,973,382, Cl. 57-58.890.

Hirano, Kenkiti: *See—*
Nakagawa, Koji; and Hirano, Kenkiti, 3,973,978.

Hirayama, Yoshio: *See—*
Ito, Kanichi; Hirayama, Yoshio; Takeuchi, Ryoichi; and Nomoto, Masao, 3,973,735.

Hirmann, Georg, to Inventa AG fur Forschung und Patentverwertung Zurich. Motors. 3,973,471, Cl. 91-472.000.

Hirono, Yoshihiko: *See—*
Fujino, Akiharu; Iwataki, Isao; and Hirono, Yoshihiko, 3,973,945.

Hirsig, Alan R.: *See—*
Worrell, G. Richard; Hirsig, Alan R.; and Grane, Henry R., 3,974,214.

Hirst, Charles M., Jr.; and Lipshield, Eugene C., to Orscheln Brake Lever Mfg. Company. Locking mechanism including a locking pin. 3,973,793, Cl. 292-144.000.

Hisano, Katsukuni: *See—*
Iizuka, Nobuyuki; Hisano, Katsukuni; Ninomiya, Satoshi; and Otawara, Yasuhiko, 3,973,404.

Hitachi, Ltd.: *See—*
Arano, Isamu, 3,973,533.
Furuya, Teruo; Suzuki, Jun; and Tanimoto, Michio, 3,973,713.
Iizuka, Nobuyuki; Hisano, Katsukuni; Ninomiya, Satoshi; and Otawara, Yasuhiko, 3,973,404.
Iwasaka, Tatsuo; Yuminaka, Takeo; Kaneko, Takashi; and Kinoshita, Hiroshi, 3,973,649.
Kuwabara, Takao, 3,974,433.
Onoda, Seiichi; Tanaka, Mitsuo; and Imoto, Katsuyuki, 3,973,828.
Suda, Seiji, 3,973,544.
Taki, Tomohiko, 3,973,877.
Yamada, Sigemitu, 3,973,891.

Hoague-Sprague Corporation: *See—*
Nigrosh, Alvin L., 3,973,475.

Hobaugh, John R.: *See—*
Rosar, Edward C.; Hobaugh, John R.; and Lepetic, Vuko M., 3,973,734.

Hochman, Harry: *See—*
Brouillette, Carl V.; and Hochman, Harry, 3,974,323.
Hodge, Donald Gordon: *See—*
Cauvain, Stanley Peter; Hodge, Donald Gordon; Muir, David Donald; and Dodds, Norman James Harold, 3,974,298.
Hodges, Steve Wayne: *See—*
Bolan, William Bernard; and Hodges, Steve Wayne, 3,973,775.
Hoechst Aktiengesellschaft: *See—*
Brinkmann, Ludwig; and Cherdron, Harald, 3,974,234.
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.
Feess, Erich, 3,973,329.
Heiss, Lorenz; and Hille, Martin, 3,974,220.
Hunger, Klaus; Ribka, Joachim; and Rieper, Wolfgang, 3,974,136.
Illmann, Gunther; and Mayer, Norbert, 3,974,117.
Ische, Friedrich; and Spietschka, Ernst, 3,974,177.
Kleiner, Hans-Jerg, 3,974,243.
Pietzsch, Siegfried; and Schaeffer, Georg, 3,974,084.
Rochlitz, Jurgen; and Wiedemann, Wolfgang, 3,973,959.
Sahm, Wilfried; Schinzel, Erich; and Rosch, Gunter, 3,974,172.
Stroszynski, Joachim, 3,973,961.
Wortmann, Joachim; Dany, Franz-Josef; Prell, Hedwig; and Kandler, Joachim, 3,974,260.
Zimmermann, Hans; Thumm, Heinrich; and Roth, Kurt, 3,973,902.
Hoffmann, Heinz: *See—*
Burckhardt, Christoph Benedikt; Grandchamp, Pierre-Andre; and Hoffmann, Heinz, 3,974,475.
Hoffmann, Hellmut; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-[3-methyl-1,3,4-triazole-(2,3,-b)-thiazol(6)yl]-(thiono)-phosphoric(phosphonic) acid esters. 3,974,171, Cl. 260-306.70E.
Hoffmann, Hewig: *See—*
Decker, Martin; Schoenleben, Willibald; Toussaint, Herbert; and Hoffmann, Hewig, 3,974,159.
Hoffmann-La Roche Inc.: *See—*
Burckhardt, Christoph Benedikt; Grandchamp, Pierre-Andre; and Hoffmann, Heinz, 3,974,475.
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, 3,974,185.
Surmatis, Joseph Donald; and Walser, Armin, 3,974,181.
Hogarth, Harold P. Apparatus and method for forming tapered tubular shafts. 3,974,012, Cl. 156-161.000.
Holava, Henry Michael: *See—*
Partyka, Richard Anthony; Holava, Henry Michael; and Beverung, Warren Neil, 3,974,165.
Holland, Varnum Smith, to Texas Instruments Incorporated. Wide dynamic current range switching regulator. 3,974,439, Cl. 323-17.000.
Holler, Hans: *See—*
Friedl, Franz; Kohler, Erich; Holler, Hans; and Gebauer, Franz, 3,973,749.
Hollis Engineering, Inc.: *See—*
Boynton, Kenneth G., 3,973,322.
Holman, Benedictus Timotheus Johannes, to U.S. Philips Corporation. Television deflection coil. 3,974,421, Cl. 315-399.000.
Holst, Rudolf, to Dragerwerk Aktiengesellschaft. Air outlet valve for diving apparatus. 3,973,588, Cl. 137-854.000.
Holzer, Carl R., Jr., to Corning Glass Works. Clamping apparatus. 3,973,764, Cl. 269-26.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nishikawa, Masao; Toshimitsu, Yoshihiko; and Aoki, Takashi, 3,973,640.
Honeywell Inc.: *See—*
Adams, James R., Jr.; and Wilwerding, Dennis J., 3,974,419.
Carson, Kenneth G., 3,974,427.
Dietiker, Paul; and Green, Norman F., 3,973,576.
Honeywell Information Systems, Inc.: *See—*
Fett, Darrell L.; Bird, David A.; and Rauser, Jerry L., 3,974,402.
Hongu, Masayuki; and Niimura, Tsutomu, to Sony Corporation. High frequency modulator, such as an amplitude modulator, including a frequency multiplier. 3,974,460, Cl. 332-31.00T.
Hooker Chemicals & Plastics Corporation: *See—*
Fuller, Willard A., 3,974,266.
Hoppe, John C.: *See—*
Venor, William J.; Hoppe, John C.; and Blount, William W., Jr., 3,973,963.
Horn, Harold E.; and Kimball, Bruce A., to CPC International Inc. Malto-dextrins of improved stability prepared by enzymatic hydrolysis of oxidized starch. 3,974,034, Cl. 195-31.00R.
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., to Diamond Shamrock Corporation. 2-[2-(5-Nitro-2-furyl)vinyl]-4-(anilino)quinazolines as growth promotants and feed efficiency enhancing agents. 3,974,277, Cl. 424-251.000.
Hornschuch, Hanns, to Ingersoll-Rand Company. Seal mounting arrangement. 3,973,780, Cl. 277-81.00R.
Horowitz, William. Self-contained measuring and dispensing device. 3,973,704, Cl. 222-361.000.
Horton, Steven A., to Anaconda Company, The. Method of preparing circuit boards comprising inductors. 3,973,321, Cl. 29-602.00R.
Hosoe, Masaya, to Machida Shigyo Co., Ltd. Tray-like container. 3,973,722, Cl. 229-31.00R.
Howard, Sol; and Schaaf, Robert. Horseshoe-shaped vacuum cleaner filter bag. 3,973,936, Cl. 55-363.000.
HPS Company, Inc.: *See—*
Porta, Frank L.; and Porta, Frank T., 3,973,791.
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, to Ceskoslovenska akademie ved. Tetrachloroethyl esters of unsaturated organic acids and the method for their preparation. 3,974,205, Cl. 260-485.00H.
Hubbard, Winchester L.; Grahame, Robert E., *Jr.*; Covey, Rupert A.; and Jancis, Elmar H., to Uniroyal Inc. Control of acarids using certain benzothiazoles or benzothiazolines. 3,974,287, Cl. 424-270.000.
Huber, John G.; and Grauer, William B., to Grumman Aerospace Corporation. Automated drilling system. 3,973,859, Cl. 408-12.000.
Hudson, Frederick W., to Xerox Corporation. Development device and method. 3,973,517, Cl. 118-637.000.
Hudson Lock, Inc.: *See—*
Patriquin, George P., 3,973,421.
Hughes Aircraft Company: *See—*
Chapman, Arthur S., 3,974,383.
Coltrin, Robert E.; Eakins, Thomas C.; and McIntyre, John E., 3,973,745.
Weller, Kenneth P., 3,974,459.
Hullmeine, Udo: *See—*
Borger, Waldemar; Hullmeine, Udo; and Voss, Ernst, 3,973,990.
Hulme, David Sanderson: *See—*
Gray, George William; Harrison, Kenneth John; Hulme, David Sanderson; and Raynes, Edward Peter, 3,974,087.
Humber, Leslie G.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 3,974,179.
Humen, John. Floating chamber machine. 3,973,469, Cl. 91-51.000.
Hummel, Hagen: *See—*
Rohrle, Manfred; and Hummel, Hagen, 3,974,381.
Hummert, George T.; Moser, Thomas D.; Edison, David M.; and Kurland, Marvin, to Westinghouse Electric Corporation. Monitoring system for elevator installation. 3,973,648, Cl. 187-29.00R.
Humphrey Thompson Enterprises Limited: *See—*
Garrett, Kenneth John; and Fox, Ronald Denis, 3,973,651.
Hund, Franz: *See—*
Woditsch, Peter; Hill, Kurt; Hund, Franz; and Rodi, Fritz, 3,974,079.
Hunger, Klaus; Ribka, Joachim; and Rieper, Wolfgang, to Hoechst Aktiengesellschaft. Modified form of a disazo pigment. 3,974,136, Cl. 260-176.000.
Hunt Manufacturing Co.: *See—*
Lincoln, Walter B., 3,973,604.
Hunter, H. Eric, to Carter-Wallace, Inc. Apparatus for assembling micro-filter units. 3,973,313, Cl. 29-208.00C.
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., to United States of America, Army. Fluidic direct-impact modulator accelerometer. 3,973,442, Cl. 73-515.000.
Hupfl, Johannes: *See—*
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.
Hurm, Karl; and Schmidt, Wolfhard, to Bayer Aktiengesellschaft. Acrylonitrile-vinylidene chloride copolymers and a process for the production thereof. 3,974,130, Cl. 260-79.3MU.
Husemeyer, Hans; and Konrad, Eugene, to Wella AG. Hair dye. 3,973,900, Cl. 8-10.100.
Husky Injection Molding Systems: *See—*
Rees, Herbert, 3,973,892.
Hutchinson, Jack M. Detachable harness for fireman's coat and the like. 3,973,643, Cl. 182-3.000.
Huwe, Maurice K. Drop marker. 3,973,513, Cl. 116-124.00B.
Hycom Incorporated: *See—*
Pylant, John D., 3,973,486.
I.P.T. - Institute for Powder Technology: *See—*
Peschl, Ivan Anton, 3,973,703.
IBM: *See—*
Zirinsky, Stanley; Irene, Eugene A.; and Silvestri, Victor J., 3,974,003.
Ichikawa, Kazumasa: *See—*
Yano, Tsuyoshi; Ichikawa, Kazumasa; Take, Takao; and Sasano, Tetsuro, 3,974,024.
ICI United States Inc.: *See—*
Lee, John Thomas Michael, 3,974,424.
Lew, Baak W., 3,974,138.
Ideal Industries, Inc.: *See—*
Scott, William J.; and Lucas, James F., 3,973,821.
Strachan, Ronald A., 3,973,318.
Idemitsu, Kosan Kabushiki-Kaisha: *See—*
Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, 3,974,126.
IFO AB: *See—*
Gustafsson, John Harry; and Froberg, Tord Egron Henry, 3,973,594.
Igarashi, Toshio: *See—*
Takahashi, Akio; Fukuda, Atsushi; and Igarashi, Toshio, 3,974,045.
Iglesias, Jose J. Stabilized cutting loop for resectoscope with unimpaired vision of the operative field. 3,973,568, Cl. 128-303.150.
Iizuka, Nobuyuki; Hisano, Katsukuni; Ninomiya, Satoshi; and Otawara, Yasuhiko, to Hitachi, Ltd. Low pressure turbine installation. 3,973,404, Cl. 60-693.000.
Ikeda, Hironosuke: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.
Ilford Limited: *See—*
Theobald, Donald David, 3,973,328.

Illinois Tool Works Inc.: *See—*
Gilliland, Ralph Wilson, 3,974,471.

Illmann, Gunther; and Mayer, Norbert, to Hoechst Aktiengesellschaft. Process for the manufacture of aqueous copolymer dispersions. 3,974,117, Cl. 260-29.6TA.

Imai, Tomoyasu: *See—*
Asaeda, Toshio; Suzuki, Ikuo; and Imai, Tomoyasu, 3,973,925.

Imasato, Yuichi: *See—*
Watanabe, Sadakazu; Shinoda, Hidenori; and Imasato, Yuichi, 3,973,725.

IMI(TAMI) Institute for Research and Development: *See—*
Mizrahi, Joseph; and Barnea, Eli, 3,973,759.

Imoto, Katsuyuki: *See—*
Onoda, Seiichi; Tanaka, Mitsuo; and Imoto, Katsuyuki, 3,973,828.

Imperial Chemical Industries Limited: *See—*
Barlow, Charles Brian; White, Brian Graham; and Tomlin, Clive Dudley Spencer, 3,974,276.
Birchall, James Derek; Cowap, David; and Park, Joseph, 3,974,072.
Evans, Dennis Ernest Mackley, 3,974,133.
Heap, Nicholas; and Nemcek, Jozef, 3,974,052.
Nemcek, Josef; and Heap, Nicholas, 3,974,053.
Young, Edwin Harry Paterson, 3,974,156.
Young, Edwin Harry Paterson, 3,974,158.

Imperial Metal Industries (Kynoch) Limited: *See—*
Chase, Michael John; Smith, Derek Anthony; and Dudley, Michael Alan, 3,973,397.

Inaba, Shigeho: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 3,974,145.

Inada, Masami; and Kondo, Toshiyuki, to Aisin Seiki Kabushiki Kaisha. Powered brake system for vehicles. 3,973,806, Cl. 303-21.0AF.

Inagaki, Takeo: *See—*
Isa, Hiroshi; Inagaki, Takeo; Kiyonaga, Yasuhiro; and Nagayama, Masuzo, 3,974,194.

Inamura, Keizo; Tatsuno, Tadayoshi; and Okoshi, Toshio, to Kansai Paint Company, Ltd. Method for coating the inner surface of metal pipes. 3,974,306, Cl. 427-183.000.

Industrial Resources, Inc.: *See—*
Rosar, Edward C.; Hobaugh, John R.; and Lepetic, Vuko M., 3,973,734.

Industrie Pirelli S.p.A.: *See—*
Mezzanotte, Mario, 3,973,612.

Indy Lighting, Inc.: *See—*
Miles, Earl F., Jr., 3,974,371.

Ingersoll-Rand Company: *See—*
Hornschuch, Hanns, 3,973,780.

Ingesson, Lars Olof: *See—*
Bratthall, Lars; Henriksson, Erik; and Ingesson, Lars Olof, 3,973,624.

Inoje, Shigeharu: *See—*
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.

Inoue, Eiichi: *See—*
Ohno, Genji; and Inoue, Eiichi, 3,973,955.

Inoue, Yoshio. Device for positioning and punching platemaking films. 3,974,374, Cl. 250-201.000.

Inryco, Inc.: *See—*
Balane, David A.; and Manzeck, Herman P., 3,973,366.

Institut Dr. Ing. Reinhard Straumann, A.G.: *See—*
Steinemann, Samuel; and Peter, Martin, 3,974,001.

Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See—*
Dezael, Claude; Deschamps, Andre; and Gruhier, Henri, 3,974,257.

Institut Francaise du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See—*
Poitevin, Jean-Pierre; and Dezael, Claude, 3,974,258.

Instrumentation Laboratory, Inc.: *See—*
Raffaele, Italo; and Rossi, Luigi, 3,973,915.

Instyut Ciezkiej Syntesy Organiczej "Blachownia": *See—*
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.

International Business Machines Corporation: *See—*
Curtis, Huntington W.; and Verkuil, Roger L., 3,974,486.
Griffiths, Donald E.; and Pugliese, Carl F., 3,974,524.
Jackson, Ralph Newton; Kern, Richard Wilhelm; and Tong, Alvin Hu, 3,973,849.
Neff, Dieter Klaus, 3,973,682.
Thomas, Donald Ralph, 3,974,443.

International Nickel Company, Inc., The: *See—*
Bieber, Clarence George; Mihalisin, John Raymond; and Galka, John Joseph, 3,973,952.
Sullivan, Arthur Francis; and Brockett, Frank Howard, III, 3,973,575.

International Nuclear Fuel Co., Ltd.: *See—*
Morita, Masato; and Morita, Reiko, 3,974,390.

Internationella Siporex Aktiebolaget: *See—*
Goransson, Rolf Erik, 3,973,795.

Inventa AG fur Forschung und Patentverwertung Zurich: *See—*
Hirmann, Georg, 3,973,471.

Iowa State University Research Foundation, Inc.: *See—*
O'Brien, Edward M., 3,974,336.

Ipri, Alfred Charles; Scott, Joseph Hurlong; and Sarace, John Carl, to RCA Corporation. IGFET on an insulating substrate. 3,974,515, Cl. 357-23.000.

Irene, Eugene A.: *See—*
Zirinsky, Stanley; Irene, Eugene A.; and Silvestri, Victor J., 3,974,003.

Isa, Hiroshi; Inagaki, Takeo; Kiyonaga, Yasuhiro; and Nagayama, Masuzo, to Lion Fat & Oil Co., Ltd. Method of separating cobalt catalyst from a liquid polyol ester product. 3,974,194, Cl. 260-410.600.

Ische, Friedrich; and Spietschka, Ernst, to Hoechst Aktiengesellschaft. Process for the purification of crude polyhalo copper phthalocyanines. 3,974,177, Cl. 260-314.500.

Ishibashi, Keijiro: *See—*
Kitano, Noritoshi; Kondo, Fusao; Kusano, Kenichi; and Ishibashi, Keijiro, 3,974,291.

Ishida, Tomio: *See—*
Sato, Kunio; Ishida, Tomio; and Sugihara, Kanji, 3,974,105.

Ishihara, Hideo: *See—*
Watanabe, Teruji; Ishihara, Hideo; and Seki, Norio, 3,974,487.

Ishizuka, Sengo: *See—*
Miyatake, Masayuki; Ishizuka, Sengo; and Takagi, Takao, 3,973,981.

Isobe, Akinori. Identification apparatus for a cylindrical container. 3,973,345, Cl. 40-309.000.

Isomura, Takuji: *See—*
Nakamura, Yoshiatsu; Nozawa, Hisato; Isomura, Takuji; and Nakagawa, Katsuyuki, 3,973,541.

Isozaki, Osamu: *See—*
Iwase, Seigo; Isozaki, Osamu; Iwasawa, Naozumi; and Watanabe, Tadashi, 3,974,303.

Israel, Mrs. Lawrence: *See—*
Close, Leo R., 3,973,418.

Itek Corporation: *See—*
Lerner, Harry, 3,973,967.

Ito, Kanichi; Hirayama, Yoshio; Takeuchi, Ryoichi; and Nomoto, Masao, to Matsumoto, Keishin, President of Agency of Industrial Science and Technology. Apparatus for pulverizing and sorting municipal waste. 3,973,735, Cl. 241-73.000.

Ito, Kazuo: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.

Ito, Shozo, to Mifuji Iron Works, Ltd. Process for continuously converting coal into a saturated hydrocarbon gas. 3,973,924, Cl. 48-202.000.

Itoh, Tetsuro; Takahashi, Tetsuo; and Yamano, Kiyoichi, to Daido Seiko Kabushiki Kaisha. Low carbon calcium-sulfur containing free-cutting steel. 3,973,950, Cl. 75-123.00D.

ITT Industries, Inc.: *See—*
Muller, Ewald, 3,973,593.

Ivester, Andrew S., to Polaroid Corporation. Mounting apparatus for a spreader roller assembly. 3,974,510, Cl. 354-86.000.

Iwasaka, Tatsuo; Yuminaka, Takeo; Kaneko, Takashi; and Kinoshita, Hiroshi, to Hitachi, Ltd. Elevator control apparatus. 3,973,649, Cl. 187-29.00R.

Iwasaki Tsushinki Kabushiki Kaisha: *See—*
Eguchi, Hisashi, 3,974,401.

Iwasawa, Naozumi: *See—*
Iwase, Seigo; Isozaki, Osamu; Iwasawa, Naozumi; and Watanabe, Tadashi, 3,974,303.

Iwase, Seigo; Isozaki, Osamu; Iwasawa, Naozumi; and Watanabe, Tadashi, to Kansai Paint Company, Ltd. Method for forming coating films. 3,974,303, Cl. 427-27.000.

Iwataki, Isao: *See—*
Fujino, Akiharu; Iwataki, Isao; and Hirono, Yoshihiko, 3,973,945.

Izura, Yoshiteru; Okano, Keisuke; and Nakano, Masaaki, to Matsushita Electric Industrial Co., Ltd. Deflection apparatus. 3,974,420, Cl. 315-379.000.

Izzo, Louis M., to General Electric Company. Underwater electroacoustic transducer construction. 3,974,474, Cl. 340-10.000.

J. Lyons & Company Limited: *See—*
Stansfield, Stephen Raymond, 3,973,668.

Jackson, Isaac S.: *See—*
Sheridan, David S.; and Jackson, Isaac S., 3,973,569.

Jackson, Ralph Newton; Kern, Richard Wilhelm; and Tong, Alvin Hu, to International Business Machines Corporation. Self-calibratable spectrum analyzer. 3,973,849, Cl. 356-97.000.

Jacobs, G. Richard; Peck, Cluff; and Soderquist, Dean G., to Corporation of the President of The Church of Jesus Christ of Latter-Day Saints. Mannequin. 3,973,840, Cl. 352-86.000.

Jacobsen Manufacturing Company: *See—*
Ecker, Franklin A.; and Saiia, Anthony J., 3,973,379.

Jacoby-Bender, Inc.: *See—*
Boyce, Edward J.; and Bidner, Harvey, 3,973,706.

Jacquemin, Francis; Terneu, Robert; and Voiturier, Jean-Pierre, to Glaverbel-Mecaniver. Fireproof glasswork. 3,974,316, Cl. 428-215.000.

Jade Controls, Inc.: *See—*
Solomon, Ralph E., 3,973,997.

Jagerstrom, Axel Henry, to Atlas Copco Aktiebolag. Method of and arrangement for controlling the speed of the movements of hydraulic booms. 3,973,747, Cl. 248-16.000.

Jahnke, Horst: *See—*
Siebke, Hans; Moro, Brigitte; Schonborn, Manfred; and Jahnke, Horst, 3,974,040.

Jahns, Edward R., to CBS Inc. Distortion control circuit. 3,973,461, Cl. 84-1.240.

Jakob, Gert; and Gansert, Willi, to Robert Bosch G.m.b.H. Water spray-resistant, ventilated housing structure. 3,973,477, Cl. 98-1.000.

James, George Stephen; Dewar, Bruce Ian; and Moergeli, Walter Rudolf, to Parel. Societe Anonyme. Electrochemical process. 3,974,049, Cl. 204-106.000.

James, Varnell L., to Boeing Company, The. Projectile energy absorbing protective barrier. 3,974,313, Cl. 428-176.000.

Jancis, Elmar H.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 3,974,287.

Janke, William R. Cutout holding clip. 3,973,295, Cl. 24-73.00B.

Janome Sewing Machine Co. Ltd.: *See—*
Eguchi, Yasukata; and Hanyu, Susumu, 3,973,508.

Janssen, Roger G.; and Schantzen, Wayne G., to Musselman, James R. Ice stud for snowmobile tracks. 3,973,808, Cl. 305-54.000.

Jansson, David Guild. Multi-user extended operation respirator. 3,973,562, Cl. 128-142.00R.

Japan Synthetic Rubber Co., Ltd.: *See—*
Nakamura, Ryuichi; Fukuhara, Seiji; Matsumoto, Shuichi; and Komatsu, Koei, 3,974,196.

Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringleben, Hans; and Knabel, Walter, to Jarchow, Friedrich G. K.; and Ringleben, Hans. Method for cementing in the manufacture of double-pane insulating glass units. 3,974,011, Cl. 156-107.000.

Jarrett, Kenneth L., Sr.: *See—*
Rinehimer, Elwood; Walters, Donald M.; and Jarrett, Kenneth L., Sr., 3,973,506.

Jarrett, Ronald T.; and Barrett, Edward J. Hay presser apparatus. 3,973,484, Cl. 100-153.000.

Jaworski, Eugene: *See—*
Breslow, Jeffrey D.; and Jaworski, Eugene, 3,973,774.

Jellema, Auke; and van der Schoot, Jelle, to Staalkat B.V. Apparatus for vertically transporting eggs or like articles. 3,973,667, Cl. 198-26.000.

Jenaer Glaswerk Schott & Gen.: *See—*
Muller, Gerd, 3,973,972.

Jensen, K. S. Alignment device for bi-fold doors. 3,973,616, Cl. 160-199.000.

Jensen, Theodore F.: *See—*
Marks, Larry D.; Palmer, Lynn D.; and Jensen, Theodore F., 3,973,778.

Jensen, Thomas H., to PPG Industries, Inc. Bushing fabrication. 3,973,717, Cl. 228-144.000.

Jepson, John W.: *See—*
Schweiker, George C.; and Jepson, John W., 3,974,238.

Jeroszko, Ronald A., to United Technologies Corporation. Combustor employing serially staged pilot combustion, fuel vaporization, and primary combustion zones. 3,973,390, Cl. 60-39.060.

Jirkovsky, Ivo L.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 3,974,179.

Jogwick, Kurt W., to Ann Arbor Circuits, Inc. Electroplating selected portions of a strip. 3,974,056, Cl. 204-207.000.

John Zink Company: *See—*
Reed, Robert D.; and Zink, John S., 3,973,899.

Johnson, Charles Louis; and Stuard, Charles Donald, to Procter & Gamble Company, The. Container having a membrane-type closure. 3,973,719, Cl. 229-5.600.

Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, to Butler Manufacturing Company. Roof structure with means to resist lateral forces. 3,973,367, Cl. 52-262.000.

Johnson, Gordon E.: *See—*
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 3,973,843.

Johnson, John David. Apparatus for applying refractory coating to the roof linings of electric arc furnaces. 3,973,730, Cl. 239-186.000.

Johnson & Johnson: *See—*
Green, Percy; Kordecki, Margaret Cook; and Lipman, Roger David Arnold, 3,973,563.

Johnson, Lee A., to Rockwell International Corporation. Radio altimeter rate linearizer. 3,974,365, Cl. 235-151.320.

Johnson, Michael R.: *See—*
Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,974,213.

Johnson, Robert P.: *See—*
Dorschner, Kenneth P.; and Johnson, Robert P., 3,974,292.

Jolly, Jean: *See—*
Warnant, Julien; and Jolly, Jean, 3,974,182.

Jones, Christopher Robin; Williams, Malcolm; and Brunt, Geoffrey Albert Kenyon, to C.A.V. Limited. Fuel systems for engines. 3,973,539, Cl. 123-139.00E.

Jones, Christopher Robin: *See—*
Williams, Malcolm; Brunt, Geoffrey Albert Kenyon; Jones, Christopher Robin; and Adey, Anthony John, 3,973,537.
Williams, Malcolm; Jones, Christopher Robin; and Crookes, Richard William, 3,973,538.

Jones, Dennis G.: *See—*
McCreery, James F.; and Jones, Dennis G., 3,973,307.

Jones, John E.: *See—*
Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger O., 3,973,378.

Jones, John F.: *See—*
Griffith, Russell K.; and Jones, John F., 3,974,239.

Jones, John Paul, to Air Products and Chemicals, Inc. Coulometrically timed indicator lamp circuits operable from high voltages. 3,974,495, Cl. 340-309.100.

Jonsson, Karl-Erik A., to Brundell Och Jonsson AB. Debarking tool. 3,973,607, Cl. 144-208.00E.

Jordan, Merrill E.; and Burbine, William G., to Cabot Corporation. Carbon black pigments and rubber compositions containing the same. 3,973,983, Cl. 106-307.000.

Joseph Lucas (Electrical) Limited: *See—*
Lane, Robert John, 3,973,287.

Joseph Lucas (Industries) Limited: *See—*
Bloom, Joseph Louis, 3,973,577.

Jowett, Terence W.; and Cross, Thomas A., to United Technologies Corporation. Automatic gas analysis and purging system. 3,973,848, Cl. 356-51.000.

Judd, David Walter: *See—*
Gallacher, John David; Nevrkla, Johann Leopold; and Judd, David Walter, 3,973,326.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Albes, Friedrich; Kleemann, Werner; and Ziemek, Gerhard, 3,973,424.
Sczepaniak, Werner; and Materne, Werner, 3,974,043.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Nakamura, Yoshiatsu; Nozawa, Hisato; Isomura, Takuji; and Nakagawa, Katsuyuki, 3,973,541.
Satsumabayashi, Kazuyoshi; and Mano, Kiyoshi, 3,973,951.
Shirao, Syoziro, 3,973,427.
Suzuki, Yasuo, 3,973,796.

Kabushiki Kaisha Takechi Koumusho: *See—*
Asayama, Kingo, 3,973,409.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Tooka, Takuzo, 3,973,906.

Kachalov, Vladimir Alexandrovich: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.

Kadin, Saul B.: *See—*
Althuis, Thomas H.; Czuba, Leonard J.; Hess, Hans-Jurgen E.; and Kadin, Saul B., 3,974,161.

Kageyama, Takao; and Kato, Hiroshi, to Nippon Electric Company, Ltd. Four-cavity velocity modulation tube. 3,974,417, Cl. 315-5.430.

Kaiser Aluminum & Chemical Corporation: *See—*
Steinke, Theodore D.; and Carter, Melvin A., 3,973,763.

Kaiser, Gregory L., to SCM Corporation. Mixed metal catalyst for isomerization of alpha-pinene to beta-pinene. 3,974,102, Cl. 252-466.00J.

Kaiser, Gregory L., to SCM Corporation. Catalyst for isomerization of alpha-pinene to beta-pinene. 3,974,103, Cl. 252-466.00J.

Kajimoto, Isamu; and Morii, Hideaki, to Morii Chokoku Co., Ltd.; and Sumikin-Kiko Co., Ltd. Plural line imprinter for gas cylinders. 3,973,485, Cl. 101-7.000.

Kajiwara, Junji: *See—*
Tsuda, Yuji; Kajiwara, Junji; and Komori, Shigekazu, 3,974,509.

Kakuichi Mfg. Co., Ltd.: *See—*
Tanaka, Kenichi, 3,974,019.

Kalb, Hans, to AEG-Kanis Turbinenfabrik GmbH. Multi-port control valve. 3,973,591, Cl. 137-625.120.

Kalir, Rami: *See—*
Patchornik, Abraham; Kalir, Rami; Fridkin, Matityahu; and Warshavsky, Abraham, 3,974,110.

Kamai, Toshiso. Leak proof dry cell. 3,973,995, Cl. 136-107.000.

Kamimura, Kazuhiko; and Yoshida, Tadao, to Sony Corporation. Transistor amplifier. 3,974,455, Cl. 330-22.000.

Kanda, Hideo: *See—*
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, 3,974,467.

Kandler, Joachim: *See—*
Wortmann, Joachim; Dany, Franz-Josef; Prell, Hedwig; and Kandler, Joachim, 3,974,260.

Kane, George K. Eye patch for large domestic animals. 3,973,561, Cl. 128-132.00R.

Kanebo, Ltd.: *See—*
Ohtomo, Koichiro; and Yoshimura, Takuji, 3,973,974.

Kaneko, Takashi: *See—*
Iwasaka, Tatsuo; Yuminaka, Takeo; Kaneko, Takashi; and Kinoshita, Hiroshi, 3,973,649.

Kansai Paint Company, Ltd.: *See—*
Inamura, Keizo; Tatsuno, Tadayoshi; and Okoshi, Toshio, 3,974,306.
Iwase, Seigo; Isozaki, Osamu; Iwasawa, Naozumi; and Watanabe, Tadashi, 3,974,303.

Kao, James T. F.: *See—*
Lanier, Carroll W.; and Kao, James T. F., 3,974,242.

Kassai, Makoto: *See—*
Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, 3,974,000.

Kassel, Karl-Heinz: *See—*
Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 3,973,960.

Kastening, Bertel: *See—*
Divisek, Jiri; Faul, Wolfgang; and Kastening, Bertel, 3,974,050.

Kato, Hiroshi: *See*—
Kageyama, Takao; and Kato, Hiroshi, 3,974,417.
Kato, Hirotetu: *See*—
Shiba, Keisuke; Hinata, Masanao; Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, 3,973,969.
Kato, Noriyoshi, to Toppan Printing Co., Ltd. Thrusting cock. 3,973,698, Cl. 222-91.000.
Kawakami, Heijiro: *See*—
Fujita, Tatsu; Kawakami, Heijiro; Yamada, Yoshiro; and Yamada, Tetsuo, 3,973,426.
Kawazu, Mitsutaka: *See*—
Kurita, Hironori; Kawazu, Mitsutaka; and Takashima, Kohki, 3,974,274.
Kazantseva, Irina Anatolievna: *See*—
Sokolsky, Dmitry Vladimirovich; Dorfman, Yakov Avraamovich; and Kazantseva, Irina Anatolievna, 3,974,085.
Kearney, Patrick. Floatable fishing device. 3,973,347, Cl. 43-17.000.
Keefe, Jack D., to Monarch Marking Systems, Inc. Fastener and method of using same. 3,973,299, Cl. 24-150.0FP.
Keil, John Gerard: *See*—
Schreiber, Richard Henry; and Keil, John Gerard, 3,974,137.
Kelcz, Frederick: *See*—
Mistretta, Charles A.; and Kelcz, Frederick, 3,974,386.
Keller, Alex Jacques, to Automatic Material Handling, Inc. Safety means for fiber pick-up and transporting apparatus. 3,973,683, Cl. 214-1.0BB.
Keller, Arthur; and Monroe, Neil J., to Babcock & Wilcox Company, The. Vapor generator. 3,973,523, Cl. 122-510.000.
Kelly, Robert C., to Upjohn Company, The. Oxazolidines of endo-6-formyl-exo-3-hydroxybicyclo[3.1.0]hexan-exo-2-acetic acid, δ-lactone. 3,974,173, Cl. 260-307.0FA.
Kenkare, Divaker B.; and Moran, Marius R., to Colgate-Palmolive Company. Pressurized composition for the production of a dry spray of mild but effective non-staining antiperspirant. 3,974,270, Cl. 424-47.000.
Kennametal Inc.: *See*—
McCreery, James F.; and Jones, Dennis G., 3,973,307.
Kennedy, Paul B., to Boeing Company, The. Diffusion welded solar cell array. 3,973,996, Cl. 136-206.000.
Kent, Allan R.: *See*—
Kotok, Alan; Kent, Allan R.; and Gross, David A., 3,974,479.
Kent, Marc T., Jr. Information display system. 3,973,341, Cl. 40-124.100.
Keprda, Jaroslav, to Siemens Aktiengesellschaft. Plural switch assembly having independent operators locked in position by cover interlock. 3,974,346, Cl. 200-5.00B.
Kern, Richard Wilhelm: *See*—
Jackson, Ralph Newton; Kern, Richard Wilhelm; and Tong, Alvin Hu, 3,973,849.
Kern, Walter J., to Austrian Ski and Machine Corporation. Clamping drill jigs on skis. 3,973,860, Cl. 408-108.000.
Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Divisek, Jiri; Faul, Wolfgang; and Kastening, Bertel, 3,974,050.
Kerstetter, Donald R.: *See*—
Buescher, William E.; and Kerstetter, Donald R., 3,974,414.
Kerwood, Joseph Edward: *See*—
Coran, Aubert Yaucher; and Kerwood, Joseph Edward, 3,974,163.
Keylwert, Johann, to Klockner-Humboldt-Deutz Aktiengesellschaft. Rotary piston internal combustion engine. 3,973,525, Cl. 123-8.050.
Khawand, Antoine B. Method and apparatus for creating visual displays. 3,973,340, Cl. 40-106.210.
Khee, Sio Pway. Appliance for cutting half-boiled eggs. 3,973,482, Cl. 99-537.000.
Kilian, Werner: *See*—
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.
Killough, Joseph R., Jr., to S & C Electric Company. Multi-phase rectifier system. 3,974,397, Cl. 307-82.000.
Kimball, Bruce A.: *See*—
Horn, Harold E.; and Kimball, Bruce A., 3,974,034.
Kimball International, Inc.: *See*—
Slaats, Mathew A.; and Slayton, J. Richard, 3,973,455.
Kimberly-Clark Corporation: *See*—
Winters, Terry L., 3,974,308.
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Novel N'-acylated phenyl-hydrazine and hydrozone derivatives. 3,974,145, Cl. 260-240.00K.
Kimura, Turugi: *See*—
Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, 3,973,999.
Kine, Masayoshi, to Shimano Industrial Company, Limited. Five speed transmission hub for bicycles. 3,973,451, Cl. 74-750.00B.
King, James E.: *See*—
Francel, Josef; King, James E.; and Woulbroun, John M., 3,973,975.
Kingsland, David O.: *See*—
Sullivan, William A.; Cassano, James R.; and Kingsland, David O., 3,973,846.
Kinoshita, Hiroshi: *See*—
Iwasaka, Tatsuo; Yuminaka, Takeo; Kaneko, Takashi; and Kinoshita, Hiroshi, 3,973,649.
Kintopp, Erich: *See*—
Distler, Walter; Kintopp, Erich; and Linke, Gerhard, 3,974,388.
Kitamoto, Tatsuji: *See*—
Tadokoro, Eiichi; and Kitamoto, Tatsuji, 3,973,920.
Kitano, Noritoshi; Kondo, Fusao; Kusano, Kenichi; and Ishibashi, Keijiro, to Sankyo Company Limited. Fungicidal compositions for dermatomycosis of animals. 3,974,291, Cl. 424-283.000.
Kitasato Institute, The: *See*—
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.
Kittle, Carl Edwin, to Deere & Company. Hydraulic system and automatically shiftable direction control valve therefor. 3,973,398, Cl. 60-427.000.
Kiyonaga, Yasuhiro: *See*—
Isa, Hiroshi; Inagaki, Takeo; Kiyonaga, Yasuhiro; and Nagayama, Masuzo, 3,974,194.
Klagges, Charles E.: *See*—
Golub, Samuel G.; and Klagges, Charles E., 3,973,819.
Klaus, Michael Josef: *See*—
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, 3,974,185.
Kleemann, Werner: *See*—
Albes, Friedrich; Kleemann, Werner; and Ziemek, Gerhard, 3,973,424.
Kleen, Gerhard: *See*—
Schiemann, Heinz; Herrmann, Albert; and Kleen, Gerhard, 3,974,440.
Klein, Hans; Ritzmann, Horst; and Kremerskothen, Peter, to Polysius AG. Silo for mixing and homogenizing bulk material. 3,973,757, Cl. 259-4.00R.
Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Carboxyphenylalkylphosphinic esters. 3,974,243, Cl. 260-941.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Keylwert, Johann, 3,973,525.
Klose, Ernst, to Gebr. Heller, Firma. Combined skin or rough turning and smoothing roller tool. 3,973,319, Cl. 29-567.000.
Kluempers, Thomas J., to C. Hager & Sons Hinge Manufacturing Company. Door closer with switch actuated thereby. 3,973,357, Cl. 49-13.000.
Knabel, Walter: *See*—
Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringleben, Hans; and Knabel, Walter, 3,974,011.
Knapp, Heinrich: *See*—
Wessel, Wolf; Schwammle, Rudolf; Schnurle, Hans; and Knapp, Heinrich, 3,973,529.
Knier, Hans Josef, to Siemens Aktiengesellschaft. Switching arrangement for the transformation of digital angles into analog sine-and/or cosine values. 3,974,498, Cl. 340-347.0DA.
Knight, Bruce L.; Rhudy, John S.; and Gogarty, William B. Injection profiles with radiation induced copolymers. 3,973,629, Cl. 166-295.000.
Knollman, Melvin Louis; Cornish, George Kent; and Fowler, Gene Roger, to Deere & Company. Crop feeding mechanism for a harvesting machine. 3,973,380, Cl. 56-14.600.
Knorpp, Eberhard: *See*—
Lutz, Karl-Anton; and Knorpp, Eberhard, 3,974,339.
Knudsen, Kenneth F., to American Chain & Cable Company, Inc. Power and free conveyor system. 3,973,504, Cl. 104-172.00S.
Kobayashi, Kazuhiko: *See*—
Saito, Nagao; Kobayashi, Kazuhiko; and Oizumi, Toshiro, 3,974,357.
Kobayashi, Tadao; Yamanoi, Akio; and Otsuka, Shin-Ichiro, to Ajinomoto Co., Inc. Process for producing yeast cells. 3,974,030, Cl. 195-27.000.
Kobe Steel Limited: *See*—
Fujita, Tatsu; Kawakami, Heijiro; Yamada, Yoshiro; and Yamada, Tetsuo, 3,973,426.
Koch, Wolfgang: *See*—
Erdmann, Dietrich; Schneider, Gerhart; and Koch, Wolfgang, 3,973,944.
Koehring Company: *See*—
Sallberg, David W.; and Meyer, Walter E., 3,974,364.
Koff, Bernard L.: *See*—
Corsmeier, Robert J.; and Koff, Bernard L., 3,973,874.
Koga, Michio; and Sato, Hideo, to Mitsubishi Petrochemical Company Limited. Process for producing modified polypropylene. 3,974,236, Cl. 260-878.00B.
Kogan, Allan Sheldon. Modular furniture units. 3,973,800, Cl. 297-440.000.
Kohlbacher, Gerhard: *See*—
Schussler, Hans; and Kohlbacher, Gerhard, 3,974,405.
Kohler, Erich: *See*—
Friedl, Franz; Kohler, Erich; Holler, Hans; and Gebauer, Franz, 3,973,749.
Kohler, Fritz, to Edouard Dubied et Cie (Societe Anonyme). Knitting machine. 3,973,416, Cl. 66-64.000.
Kojima, Michio: *See*—
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.
Kojima, Tamotsu: *See*—
Fujiwhara, Mitsuto; Matsuo, Syunji; and Kojima, Tamotsu, 3,973,968.
Kokochak, David G., to General Motors Corporation. Rotary combustion engine. 3,973,526, Cl. 123-8.450.
Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Watanabe, Teruji; Ishihara, Hideo; and Seki, Norio, 3,974,487.
Kolbach, Charles G., to Scott Paper Company. Method for forming fibrous pads. 3,973,291, Cl. 19-148.000.

Kolling, Heinrich: *See—*
Kurz, Jurgen; Kolling, Heinrich; and Federmann, Manfred, 3,974,204.
Kolomnikov, Igor Sergeevic: *See—*
Volpin, Mark Afimovic; Hetfleja, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.
Komatsu, Koei: *See—*
Nakamura, Ryuichi; Fukuhara, Seiji; Matsumoto, Shuichi; and Komatsu, Koei, 3,974,196.
Komiya, Akitoshi: *See—*
Sato, Yasuhiko; Komiya, Akitoshi; and Shiobara, Toshio, 3,974,122.
Komori, Norio: *See—*
Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, 3,974,126.
Komori, Shigekazu: *See—*
Tsuda, Yuji; Kajiwara, Junji; and Komori, Shigekazu, 3,974,509.
Konan Camera Research Institute: *See—*
Nagasaka, Masuo, 3,973,748.
Konda, Yaeko: *See—*
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.
Kondo, Fusao: *See—*
Kitano, Noritoshi; Kondo, Fusao; Kusano, Kenichi; and Ishibashi, Keijiro, 3,974,291.
Kondo, Toshiyuki: *See—*
Inada, Masami; and Kondo, Toshiyuki, 3,973,806.
Kondo, Yasumitsu: *See—*
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.
Konig, Ferdinand, to Sulzer Brothers Limited. Circuit arrangement for overload protection of a drive motor. 3,974,422, Cl. 317-13.00A.
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, to Bayer Aktiengesellschaft. Ureidoacetamidopenicillins. 3,974,140, Cl. 260-239.100.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, to Bayer Aktiengesellschaft. Penicillins. 3,974,141, Cl. 260-239.100.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, to Bayer Aktiengesellschaft. Penicillins. 3,974,142, Cl. 260-239.100.
Konig, Hans-Bodo: *See—*
Schrock, Wilfried; Metzger, Karl-Georg; and Konig, Hans-Bodo, 3,974,288.
Konishi, Seizo: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.
Konishiroku Photo Industry Co., Ltd.: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; and Kojima, Tamotsu, 3,973,968.
Konrad, Eugene: *See—*
Husemeyer, Hans; and Konrad, Eugene, 3,973,900.
Konuma, Hideo: *See—*
Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, 3,974,126.
Koppers Company, Inc.: *See—*
Greco, Nicholas P.; and Webb, David A., 3,973,971.
Tucker, Linwood G., 3,974,038.
Kordecki, Margaret Cook: *See—*
Green, Percy; Kordecki, Margaret Cook; and Lipman, Roger David Arnold, 3,973,563.
Korkowski, Eberhard: *See—*
Engfer, Ortwin; and Korkowski, Eberhard, 3,973,804.
Korner, Otto; Benninghoff, Fritz; and Spies, Klaus, to DIEHL. Wire cable chain with detachable traveling cushions. 3,973,807, Cl. 305-40.000.
Kornylak Corporation: *See—*
Tabler, Charles P., 3,973,669.
Kot, Boleslaw: *See—*
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.
Kotok, Alan; Kent, Allan R.; and Gross, David A., to Digital Equipment Corporation. Memory for use in a computer system in which memories have diverse retrieval characteristics. 3,974,479, Cl. 340-172.500.
Kramer, Horst: *See—*
Frenken, Hans; Schindler, Georg; and Kramer, Horst, 3,973,310.
Kramer, Lawrence I. Method and apparatus for feeding sheet material. 3,973,767, Cl. 271-12.000.
Kramer, Wolfgang: *See—*
Buchel, Karl Heinz; Kramer, Wolfgang; and Frohberger, Paul-Ernst, 3,974,174.
Krassig, Johannes Adolf: *See—*
Cremer, Joseph; Harnisch, Heinz; Krassig, Johannes Adolf; Hupfl, Johannes; and Gschaider, Werner, 3,974,251.
Kraus, Thaddaus, to Balzers Patent und Beteiligungs AG. Method and apparatus for enriching a lower molecular weight gas with substances of higher molecular weight contained therein. 3,973,929, Cl. 55-17.000.
Krefting, Sherman: *See—*
Baron, Joseph J., Jr.; and Krefting, Sherman, 3,974,321.
Kremerskothen, Peter: *See—*
Klein, Hans; Ritzmann, Horst; and Kremerskothen, Peter, 3,973,757.
Kressel, Henry; Ettenberg, Michael; and Ladany, Ivan, to RCA Corporation. Electroluminescent edge-emitting diode comprising a light reflector in a groove. 3,974,514, Cl. 357-17.000.
Kronogard, Sven-Olof, to United Turbine AB & Co., Kommanditbolag. Gas turbine power plant. 3,973,396, Cl. 60-39.660.
Krug, Hans; Niklas, Hans; and Thornblad, Rolf, to Varta Batterie Aktiengesellschaft. Tubular electrode. 3,973,992, Cl. 136-55.000.
Krupp-Koppers GmbH: *See—*
Staege, Hermann; and Goeke, Eberhard, 3,973,923.
Kruse, Frederick W. Funnel with signal. 3,973,602, Cl. 141-95.000.
Kubicek, Donald H., to Phillips Petroleum Company. Steam-activated olefin disproportionation catalysts. 3,974,100, Cl. 252-455.00R.
Kuczura, Anatol: *See—*
Cheney, Thomas K.; and Kuczura, Anatol, 3,974,343.
Kudo, Makoto: *See—*
Suzuki, Takeshi; Tanaka, Hiroshi; and Kudo, Makoto, 3,973,965.
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, to Lion Dentifrice Co., Ltd., The. Process for producing cholestane type steroids. 3,974,188, Cl. 260-397.200.
Kudo, Toshiyuki: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.
Kuehnle, Manfred R., to Coulter Information Systems, Inc. Electrophotographic process employing signal comparison. 3,973,956, Cl. 96-1.00R.
Kuepper, Friedrich-Wilhelm; and Streck, Roland, to Chemische Werke Huls Aktiengesellschaft. Process for the production of pure cyclopentene. 3,974,231, Cl. 260-666.00A.
Kuffner, Karl: *See—*
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, 3,973,979.
Kuiper, Adrianus: *See—*
Van Bakel, Adrianus Maria; Fransen, Jan Josephus Bernardus; and Kuiper, Adrianus, 3,973,816.
Kumagai, Hidehiko: *See—*
Yamada, Hideaki; Kumagai, Hidehiko; and Ohkishi, Haruyiki, 3,974,031.
Kummer, Pierre. Clamping tool holder for reversible cutting element. 3,973,309, Cl. 29-96.000.
Kuna, Wayne A.: *See—*
Morrison, Howard J.; Hicks, Alan; and Kuna, Wayne A., 3,973,494.
Kunkle, Gerald E.: *See—*
Edge, Charles K.; and Kunkle, Gerald E., 3,973,940.
Kunz, Peter, to Mettler Instruments AG. Precision balance with resiliently mounted weighing pan. 3,973,637, Cl. 177-189.000.
Kunz, Robert H.; and Davis, Gary L., to Chromalloy American Corporation. Coupling structure. 3,973,789, Cl. 285-39.000.
Kunze, Claus, to Heimann GmbH. Light-sensitive target. 3,974,415, Cl. 313-371.000.
Kurita, Hironori; Kawazu, Mitsutaka; and Takashima, Kohki, to Tanabe Seiyaku Co., Ltd. Process for preparing a cyclodextrin derivative. 3,974,274, Cl. 424-180.000.
Kurland, Marvin: *See—*
Hummert, George T.; Moser, Thomas D.; Edison, David M.; and Kurland, Marvin, 3,973,648.
Kuroda, Akio: *See—*
Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, 3,974,232.
Kuroyanagi, Kunihiro, to Sony Corporation. Chrominance subcarrier phase control system. 3,974,520, Cl. 358-17.000.
Kurz, Jurgen; Kolling, Heinrich; and Federmann, Manfred, to Bayer Aktiengesellschaft. Thionosalicylic acid anilides and salts thereof. 3,974,204, Cl. 260-479.00C.
Kusano, Kenichi: *See—*
Kitano, Noritoshi; Kondo, Fusao; Kusano, Kenichi; and Ishibashi, Keijiro, 3,974,291.
Kushelev, Jury Nikolaevich: *See—*
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.
Kusters, Edward: *See—*
Appenzeller, Valentin, 3,973,483.
Kuwabara, Takao, to Hitachi, Ltd. Automatic control apparatus with saturation element. 3,974,433, Cl. 318-635.000.
Kvam, Ole Jacob. Bottle closure. 3,973,688, Cl. 215-272.000.
Kwon, Sung Lim; and Pausch, Josef, to General Resource Corporation. Conveyor line fluidizer. 3,973,802, Cl. 302-24.000.
L.M. Ericsson Pty Ltd.: *See—*
Ghisler, Walter, 3,974,340.
La-Z-Boy Chair Company: *See—*
White, David B., 3,973,798.
Ladany, Ivan: *See—*
Kressel, Henry; Ettenberg, Michael; and Ladany, Ivan, 3,974,514.
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., to GTE Sylvania Incorporated. Free flowing powder and process for producing it. 3,973,948, Cl. 75-.5AB.
Laganis, Deno, to Schenectady Chemicals, Inc. Water-soluble wire enamel. 3,974,115, Cl. 260-29.20N.
Laing, Nikolaus. Temperature-control system with rotary heat exchangers. 3,973,622, Cl. 165-86.000.
Lake Region Manufacturing Company, Inc.: *See—*
Fleischhacker, John J.; and Fleischhacker, Joseph F., Jr., 3,973,556.

Lamm, Gunther: *See*—
Dehnert, Johannes; and Lamm, Gunther, 3,974,123.

Lamparsky, Dietmar; and Schudel, Peter, to Givaudan Corporation. p-Meth-8-ene-6-thiol-2-one. 3,974,222, Cl. 260-586.00R.

Lanahan, John H.; and Abraham, William W., to GAF Corporation. Information storage card with coded vertical edge. 3,974,361, Cl. 235-61.12R.

Lancisault, Joseph A. Combination solar heat collector and awning. 3,973,553, Cl. 126-271.000.

Landau, Michael B.: *See*—
Bloomfield, David P.; and Landau, Michael B., 3,973,993.

Lane, Robert John, to Joseph Lucas (Electrical) Limited. Headlamp wiper assemblies. 3,973,287, Cl. 15-250.250.

Lange, Howard G., to Zenith Radio Corporation. Method for manufacturing a color cathode ray tube and for making screening and mask masters used therein. 3,973,964, Cl. 96-36.100.

Langen & Co.: *See*—
Strauff, Gunther, 3,973,589.

Lanier, Carroll W.; and Kao, James T. F., to Ethyl Corporation. Process for producing phosphazene fire retardant and product. 3,974,242, Cl. 260-927.00N.

LaPorte, Robert Josse; and des Reyssiers, Pierre Maurice Malachard, to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes. Inflatable structures. 3,973,363, Cl. 52-2.000.

Laundon, Brian: *See*—
Cook, Martin Christopher; and Laundon, Brian, 3,974,150.

Lauro, Fernand, to Commissariat a l'Energie Atomique. Device for mounting plastic non-rigid tubes in evaporators. 3,974,022, Cl. 159-13.00B.

Lauzier, Rene, to Cegedur GP. Railing and method of assembly. 3,973,756, Cl. 256-21.000.

Lawrence Peska Associates: *See*—
Cervera, Frank, 3,973,422.

Lawrence Peska Associates, Inc.: *See*—
Cardinale, John, 3,973,327.
Glick, Allan, 3,973,687.
Moses, Bernice, 3,973,276.
Myers, Gene Edward, 3,973,853.
Schwemmer, Ronald; and Crozier, William, 3,973,338.

Lawrenson, Malcolm John, to BP Chemicals International Limited. Process for the production of a rhenium heptoxide/alumina disproportionation catalyst. 3,974,233, Cl. 260-683.00D.

Lawson, John A., to Zygo Corporation. Lens where the light rays obey the relation H=KFθ. 3,973,833, Cl. 350-232.000.

Leach, Harry W.: *See*—
Harjes, Clarence F.; Leach, Harry W.; and Trp, John M., 3,974,032.

Leach, Sam Leslie. Lightweight aggregate and composition and method of making same. 3,973,973, Cl. 106-40.00R.

Leary, David E.: *See*—
Marzocchi, Alfred; and Leary, David E., 3,973,613.

Lebedev, Vitaly Fedorovich: *See*—
Popov, Igor Vasilievich; Bochkarev, Gely Romanovich; Lebedev, Vitaly Fedorovich; and Baryshnikov, Feaor Anisimovich, 3,974,070.

Lederer, David B., to Detection Systems, Inc. Margin test switch for photoelectric intruder detection devices. 3,974,488, Cl. 340-214.000.

Ledieu, Jean; and Eschenbrenner, Philippe, to Societe CYBCO. Machine for the finding of an optimum passage. 3,974,481, Cl. 340-172.500.

Lee, Chien Fu. Radial flow type pump. 3,973,867, Cl. 415-143.000.

Lee, John Thomas Michael, to ICI United States Inc. Variable resistance bridge element. 3,974,424, Cl. 317-80.000.

Le Frere, Jean-Paul, to Groupement pour les Activities Atomiques et Avancees "GAAA". Method and device for electromagnetic pumping by conduction of liquid metals having low electrical conductivity. 3,973,878, Cl. 417-50.000.

Legato, Gerard J.: *See*—
Micchelli, Albert L.; Nowak, Frank A., Jr.; and Legato, Gerard J., 3,973,901.

Leinum, Virgil D.: *See*—
Naley, Lowell B.; Haberkorn, Robert W.; and Leinum, Virgil D., 3,973,618.

Leitner, Gordon F.: *See*—
Cleaver, John C.; Leitner, Gordon F.; and Wiegratz, Fred G., 3,973,592.

Lenderman, Gerald H. Tire-inflation appraisal apparatus. 3,973,436, Cl. 73-146.200.

Leonard, Robert J.: *See*—
Stumpf, Richard J.; Watson, Waldon O.; and Leonard, Robert J., 3,973,839.

Leopold, Donald L.; and Moulton, Clifford C., Sr., to Capsule Clutch Inc. Transmission device and cam actuator therefore. 3,973,660, Cl. 192-93.00A.

Lepetic, Vuko M.: *See*—
Rosar, Edward C.; Hobaugh, John R.; and Lepetic, Vuko M., 3,973,734.

L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, to Ciba-Geigy Corporation. Azomethine pigments. 3,974,149, Cl. 260-242.000.

Lerner, Harry, to Itek Corporation. Processes utilizing photographic element containing a physical development activator. 3,973,967, Cl. 96-48.0PD.

LeRoche Navarron, Marguerite Severine Lucie, to Serdex-Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation. Reserpic acid derivatives. 3,974,164, Cl. 260-287.00A.

Lesene, Iolanta Vladimiro: *See*—
Noreika, Rimas-Kazimeras Mechislovo; Musnitskas, Juozas-Romanas Juozo; Lesene, Iolanta Vladimiro; and Zdanavichjus, Ionas Iona, 3,974,139.

Lesyk, Joseph N.; Ludwig, David P.; and Monahan, Jack J., to Western Electric Company, Inc. Compliant bonding method. 3,973,714, Cl. 228-106.000.

Levi, Enrico, to Advanced Technology Laboratories, Inc. Process and equipment for the magnetic separation of isotopes. 3,973,926, Cl. 55-3.000.

Lew, Baak W., to ICI United States Inc. Method of preparing butyl polyglycosides. 3,974,138, Cl. 536-4.000.

Lewis, Basil Charles, Jr.; Mathews, James Robert; and Von Ohlsen, Louis Henry, Jr., to Bell Telephone Laboratories, Incorporated. Encapsulation for high frequency semiconductor device. 3,974,518, Cl. 357-81.000.

Lewmar Marine Limited: *See*—
Fawcett, Derek James, 3,973,755.

Libbey-Owens-Ford Company: *See*—
Ahluwalia, Surendra S., 3,973,673.

Licentia Patent-Verwaltungs-G.m.b.H.: *See*—
Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 3,973,960.
Offermann, Bernd Peter, 3,974,391.
Schussler, Hans; and Kohlbacher, Gerhard, 3,974,405.

Licitis, Gunars: *See*—
Glass, Marvin I.; Barlow, Gordon A.; and Licitis, Gunars, 3,973,773.

Life Savers, Inc.: *See*—
Witzel, Frank, 3,974,293.

Lilla, Allen G. Product and method for forming in situ insoluble metal silicates in wood pores for fire retardation and preservation. 3,974,318, Cl. 428-260.000.

Lin, Kang: *See*—
Fuchs, Julius Jakob; and Lin, Kang, 3,973,947.

Lincoln, Walter B., to Hunt Manufacturing Co. Single cutter pencil sharpener. 3,973,604, Cl. 144-28.800.

Lind, Wilton H., to Chevron Research Company. Alkylphenol disulfonates of improved color by neutralizing with strong caustic. 3,974,210, Cl. 260-512.00R.

Lindahl, Hilmer C.: *See*—
Friend, Aaron D.; and Lindahl, Hilmer C., 3,974,429.

Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., to Xerox Corporation. Electrostatographic imaging apparatus. 3,973,843, Cl. 355-3.00R.

Lindblad, Nero R.; Till, Henry R.; and Beatty, Charles L., to Xerox Corporation. Method of reducing friction in blade cleaning of imaging surfaces. 3,973,845, Cl. 355-15.000.

Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, to Continental Gummi-Werke Aktiengesellschaft. Device for the production of toothed belts. 3,973,894, Cl. 425-370.000.

Lineback, Lynn D.: *See*—
Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger Q., 3,973,378.

Linke, Gerhard: *See*—
Distler, Walter; Kintopp, Erich; and Linke, Gerhard, 3,974,388.

Lion Dentifrice Co., Ltd., The: *See*—
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, 3,974,188.

Lion Fat & Oil Co., Ltd.: *See*—
Isa, Hiroshi; Inagaki, Takeo; Kiyonaga, Yasuhiro; and Nagayama, Masuzo, 3,974,194.
Okumura, Osamu; Yaguchi, Katsumi; Adachi, Ikuo; and Nagayama, Masuzo, 3,974,211.

Lipman, Roger David Arnold: *See*—
Green, Percy; Kordecki, Margaret Cook; and Lipman, Roger David Arnold, 3,973,563.

Lipschutz, Paul, to Societe d'Exploitation des Brevets Neiman SA. Reversing switch controlled by a safety lock having a cylindrical barrel. 3,974,348, Cl. 200-44.000.

Lipshield, Eugene C.: *See*—
Hirst, Charles M., Jr.; and Lipshield, Eugene C., 3,973,793.

Liquid Controls Corporation: *See*—
Siebold, Howard E., 3,973,582.

Lissant, Kenneth J., to Petrolite Corporation. Emulsion suspensions and process for adding same to system. 3,974,116, Cl. 260-29.2UA.

List, Hans. Timing device for a fuel injection pump. 3,973,540, Cl. 123-139.0AQ.

Little, Little J.: *See*—
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,973,442.

Litton Business Systems, Inc.: *See*—
Madison, Theodore N., 3,973,663.

Litton Systems, Inc.: *See*—
Loomer, Weston R., 3,973,685.

Litz, Harold. Crankcase-scavenged four stroke engine. 3,973,532, Cl. 123-75.0CC.

Lobb, Daniel Richard, to Redifon Limited. Scanning devices. 3,973,826, Cl. 350-7.000.

Lochmann, Lubomir; Coupek, Jiri; and Trekoval, Jiri, to Ceskoslovenska akademie ved. Polymeric alkoxides based on hydroxyalkyl methacrylates and a method for their preparation. 3,974,111, Cl. 260-2.50R.

Lockard, Joseph Larue, to AMP Incorporated. Switch assembly having rotatable, pivoted or slidable actuator and diode structure mounted between actuator contacts. 3,974,347, Cl. 200-6.00R.

Lofberg, Gustaf Gerhard, to Supra Aktiebolag. Container for minimizing stresses. 3,973,609, Cl. 150-1.000.

Lofmark, Bengt Gustav, to Telefonaktiebolaget L M Ericsson. Pilot receiver. 3,974,447, Cl. 325-1.000.

Logan, Corrigan D., to Logan Enterprises Inc. Foot cleaning apparatus having soap supply and brushing means. 3,973,286, Cl. 15-21.00D.

Logan Enterprises Inc.: *See*—
Logan, Corrigan D., 3,973,286.

Logan, Robert; and McGregor, Adam, to British Carpets Ltd. Carpet making machine. 3,974,020, Cl. 156-435.000.

Logsdon, Hillard Glenn, to Aeronca, Inc. Mixing valve for air distributing systems. 3,973,590, Cl. 137-601.000.

Lokaj, Jan: *See*—
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 3,974,205.

Long, George B., to General Motors Corporation. Microwave utensil with reflective surface handle. 3,974,354, Cl. 219-10.55E.

Long Manufacturing Co., Inc.: *See*—
Atkinson, Wallace E., 3,973,419.

Loomer, Weston R., to Litton Systems, Inc. Photoelectric sensing apparatus for pallet storage systems. 3,973,685, Cl. 214-16.00B.

Louderback, Allan L. Blood control standard. 3,973,913, Cl. 23-230.00B.

Loveland, Winton, to Loveshaw Corporation, The. Automatic carton closing machine equipped with balancing tether suspensions of the elevating flap-folding and flap-anchoring head. 3,973,375, Cl. 53-374.000.

Loveshaw Corporation, The: *See*—
Loveland, Winton, 3,973,375.

Loy, Robert E., to McGraw-Edison Company. Coil end-turn support structure for large dynamoelectric machines. 3,974,409, Cl. 310-260.000.

Lucas, James F.: *See*—
Scott, William J.; and Lucas, James F., 3,973,821.

Luce, David A., to Moog Music, Inc. Wide dynamic range voltage controlled filter for electronic musical instruments. 3,974,461, Cl. 332-17.000.

Ludwig, David P.: *See*—
Lesyk, Joseph N.; Ludwig, David P.; and Monahan, Jack J., 3,973,714.

Lugosi, Robert, to Westinghouse Electric Corporation. Uniform land length die. 3,973,428, Cl. 72-467.000.

Luh, Nancy N. R.; and Palmer, James K., to Massachusetts Institute of Technology. Dehydrated banana product. 3,974,301, Cl. 426-640.000.

Lummus Company, The: *See*—
Snell, George J., 3,974,253.
Sze, Morgan C.; and Snell, George J., 3,974,073.

Lundahl, Ezra Cordell, to Ezra C. Lundahl Inc. Compacting method for stacking bulk hay. 3,973,377, Cl. 56-1.000.

Lundberg, Robert D.; Phillips, Robert R.; Westerman, Lowell; and Bock, Jan, to Exxon Research and Engineering Company. Blends of sulfonated elastomers with crystalline polyolefins. 3,974,241, Cl. 260-897.00B.

Lundberg, Robert D.: *See*—
Bock, Jan; Lundberg, Robert D.; Phillips, Robert R.; and Makowski, Henry S., 3,974,240.

Lundgren, Evert Gustav, to Sandvik Aktiebolag. Cutting tool. 3,973,308, Cl. 29-95.00R.

Lupanov, Pavel Alexandrovich: *See*—
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Lupinski, John H.; and McQuade, James M., to General Electric Company. Method for making polyimide coated conductors in a continuous manner and products made thereby. 3,974,324, Cl. 428-458.000.

Lurie, Boris Isaevich: *See*—
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Lussier, Roger Jean; Magee, John Storey, Jr.; Albers, Edwin Wolf; and Surland, George John, to W. R. Grace & Co. High activity amorphous silica-alumina catalyst. 3,974,099, Cl. 252-453.000.

Lutz, Karl-Anton; and Knorpp, Eberhard, to Siemens Aktiengesellschaft. Method of transmitting digital information in a time-division multiplex telecommunication network. 3,974,339, Cl. 179-15.0BS.

Luzier, Harman E.; Colt, Jon C.; and Cobb, Douglas R., to Audichron Company, The. Apparatus for automatic message reprogramming of a message announcement system. 3,974,338, Cl. 179-6.00C.

Lychak, Veniamin Samuilovich: *See*—
Marbukh, Veniamin Anatolievich; Lychak, Veniamin Samuilovich; and Goncharov, Evgeny Andreevich, 3,974,393.

Mabie, Curtis P., to United States of America, Health, Education and Welfare. Additive composition for making dental materials. 3,973,970, Cl. 106-35.000.

Machida Shigyo Co., Ltd.: *See*—
Hosoe, Masaya, 3,973,722.

Maciejewski, Zdzislaw: *See*—
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.

Mackey, James R.: *See*—
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., 3,974,014.

MacLeod Company, The: *See*—
Seiwert, Paul J., 3,973,573.

Macotech Corporation: *See*—
Adams, Lyle C., 3,974,431.

Madison, Theodore N., to Litton Business Systems, Inc. Typewriter power roll construction and mounting. 3,973,663, Cl. 197-16.000.

Maeder, Heinz B., to Motorola, Inc. TV remote controller. 3,974,451, Cl. 325-392.000.

Magee, John Storey, Jr.: *See*—
Lussier, Roger Jean; Magee, John Storey, Jr.; Albers, Edwin Wolf; and Surland, George John, 3,974,099.

Mager, Eric L., to GTE Sylvania Incorporated. Fluorescent lamp having improved phosphor coating. 3,973,691, Cl. 220-2.10R.

Magerlein, Barney J., to Upjohn Company, The. 16-Fluoro prostaglandin E_2 analogs. 3,974,189, Cl. 260-408.000.

Magerlein, Barney J., to Upjohn Company, The. 16-Fluoro prostaglandin A_1 analogs. 3,974,190, Cl. 260-408.000.

Magerlein, Barney J., to Upjohn Company, The. 16-Fluoro prostaglandin F_1 analogs. 3,974,191, Cl. 260-408.000.

Magerlein, Barney J., to Upjohn Company, The. 16-Fluoro prostaglandin B_1 analogs. 3,974,192, Cl. 260-408.000.

Magerlein, Barney J., to Upjohn Company, The. 16-Fluoro prostaglandin B_2 analogs. 3,974,193, Cl. 260-408.000.

Maher, William Joseph. Method of making plant container. 3,973,316, Cl. 29-416.000.

Mahle GmbH: *See*—
Rohrle, Manfred; and Hummel, Hagen, 3,974,381.

Mahoney, Ralph W., to Sperry Rand Corporation. High speed printer for printing non-printable characters as selectably chosen printable mates. 3,973,487, Cl. 101-93.290.

Makowski, Henry S.: *See*—
Bock, Jan; Lundberg, Robert D.; Phillips, Robert R.; and Makowski, Henry S., 3,974,240.

Maley, Frank, to Research Corporation. Radioimmune assay method for detection of gonorrhea antibodies. 3,974,269, Cl. 424-1.500.

Malinich, Richard M., to Xerox Corporation. Programmable billing system. 3,974,363, Cl. 235-925.00B.

Mangum, John W.: *See*—
Stewart, Solomon Lan, 3,973,639.

Manna, Lee M.: *See*—
Chmela, John F.; and Manna, Lee M., 3,974,369.

Manning, Robert E., to Sandoz, Inc. N-substituted-4-T-butyl-1-pyridinethiocarboxamides and their use for treatment of inflammation or pain. 3,974,283, Cl. 424-263.000.

Mano, Kiyoshi: *See*—
Satsumabayashi, Kazuyoshi; and Mano, Kiyoshi, 3,973,951.

Manzeck, Herman P.: *See*—
Balane, David A.; and Manzeck, Herman P., 3,973,366.

Marbukh, Veniamin Anatolievich; Lychak, Veniamin Samuilovich; and Goncharov, Evgeny Andreevich. Method of switching hydroelectric unit from group power control into the individual power control duty. 3,974,393, Cl. 290-40.00R.

Marcus, Rudolph J.; and Gloye, Eugene E., to United States of America, Navy. Method for chemiluminescently detecting infiltration of protected perimeters and the like. 3,973,466, Cl. 89-1.00A.

Markos, Charles S., to G. D. Searle & Co. (16α)-16,17-alkylidenebis(oxy)-3-arylpregna-2,4-trien-20-ones. 3,974,143, Cl. 260-239.55D.

Markowski, Stanley J.; and Nolan, James J., to United Technologies Corporation. Low emission combustion chamber. 3,973,395, Cl. 60-39.650.

Marks, Harold C.: *See*—
Beisch, Hans R.; and Marks, Harold C., 3,973,801.

Marks, Larry D.; Palmer, Lynn D.; and Jensen, Theodore F., to Avnet, Inc. Enclosed belt drive for record player turntable. 3,973,778, Cl. 274-39.00R.

Marlan Company: *See*—
Dunn, Lyman D.; and Shields, John, 3,974,071.

Marshall, Denis John: *See*—
Armstrong, John Richard Carew; and Marshall, Denis John, 3,973,712.

Marshall, Elmer, to Olinkraft, Inc. Cutting die for sealing corrugated board. 3,973,476, Cl. 93-59.0ES.

Martin, Albert Edward; and Fillion, Stanley Herbert, to Dresser Industries, Inc. Transition casting for use in sills of freight cars. 3,973,681, Cl. 213-8.000.

Martin Marietta Corporation: *See*—
Thomas, Frank J.; and Farrow, Max W., 3,974,328.

Martinaud, Jacques-Pierre: *See*—
Berthoux, Jean; and Martinaud, Jacques-Pierre, 3,974,227.

Martinez, Rudolph J., to Portable Pool Covers, Inc. Ladder for swimming pools, and the like. 3,973,646, Cl. 182-97.000.

Marvin Glass & Associates: *See*—
Breslow, Jeffrey D.; and Jaworski, Eugene, 3,973,774.
Glass, Marvin I.; Barlow, Gordon A.; and Licitis, Gunars, 3,973,773.

Morrison, Howard J.; Hicks, Alan; and Kuna, Wayne A., 3,973,494.
Marzocchi, Alfred; and Leary, David E., to Owens-Corning Fiberglas Corporation. Tire reinforcement. 3,973,613, Cl. 152-361.0FP.
Mashinistov, Boris Fedorovich: *See—*
Razgulov, Mikhail Mikhailovich; Potekhina, Lidia Alexandrouna; and Mashinistov, Boris Fedorovich, 3,973,570.
Mason, Les. Fishing pole holder. 3,973,346, Cl. 43-15.000.
Massachusetts Institute of Technology: *See—*
Bernacki, Stephen E., 3,974,382.
Luh, Nancy N. R.; and Palmer, James K., 3,974,301.
Pratt, George W., Jr., 3,974,412.
Masters, Christopher F. Method of making a perforating blade. 3,973,452, Cl. 76-101.00A.
Masuda, Senichi. Particle charging device and an electric dust collecting apparatus. 3,973,933, Cl. 55-139.000.
Matarese, John: *See—*
Fischman, Martin; and Matarese, John, 3,973,545.
Materne, Werner: *See—*
Szczepaniak, Werner; and Materne, Werner, 3,974,043.
Mathers, James E.: *See—*
Ferri, John L.; Mathers, James E.; and Yale, Ramon L., 3,974,389.
Mathes, Stanley, to Syntex Puerto Rico Inc. Inhalation device. 3,973,566, Cl. 128-266.000.
Mathews, James Robert: *See—*
Lewis, Basil Charles, Jr.; Mathews, James Robert; and Von Ohlsen, Louis Henry, Jr., 3,974,518.
Mathias, Richard G.: *See—*
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., 3,973,815.
Mathou, Marcel. Sliding panels dismountable bed. 3,973,280, Cl. 5-99.00B.
Matsuhisa, Seikichi: *See—*
Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, 3,974,232.
Matsumoto, Keishin, President of Agency of Industrial Science and Technology: *See—*
Ito, Kanichi; Hirayama, Yoshio; Takeuchi, Ryoichi; and Nomoto, Masao, 3,973,735.
Matsumoto, Shuichi: *See—*
Nakamura, Ryuichi; Fukuhara, Seiji; Matsumoto, Shuichi; and Komatsu, Koei, 3,974,196.
Matsumoto, Takeo: *See—*
Suzuki, Tsutomu; Matsumoto, Takeo; and Sobukawa, Masahiro, 3,973,456.
Matsumoto, Toshiaki, to Minolta Camera Kabushiki Kaisha. Electrical switch assembly. 3,974,511, Cl. 354-147.000.
Matsuo, Syunji: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; and Kojima, Tamotsu, 3,973,968.
Matsushita Electric Industrial Co., Ltd.: *See—*
Izura, Yoshiteru; Okano, Keisuke; and Nakano, Masaaki, 3,974,420.
Sato, Kunio; Ishida, Tomio; and Sugihara, Kanji, 3,974,105.
Tanaka, Toshiharu, 3,974,466.
Tanigawa, Shizuhiko; Yamazoe, Yoshinori; and Nakamura, Chihiro, 3,974,017.
Tatsuzawa, Yoshinobu, 3,974,337.
Tsuda, Yuji; Kajiwara, Junji; and Komori, Shigekazu, 3,974,509.
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, 3,973,830.
Matulis, Raymond M.: *See—*
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., 3,974,014.
Maurer, Thomas: *See—*
Hamann, Walter; and Maurer, Thomas, 3,974,379.
May, Carl Jerome, Jr.; and Sorin, Victor Basil, to Bell Telephone Laboratories, Incorporated. Adaptive synchronization system. 3,974,333, Cl. 178-69.50R.
May, Marvin I. Water bed liner holder. 3,973,282, Cl. 5-370.000.
Mayer, Arthur. Solid-state resolver apparatus. 3,974,367, Cl. 235-189.000.
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, to Hoffmann-La Roche Inc. Hexahydrocyclopentano[b]furans having a 2-C C containing substituent in the 4-position. 3,974,185, Cl. 260-346.20R.
Mayer, Norbert: *See—*
Illmann, Gunther; and Mayer, Norbert, 3,974,117.
Mayville Engineering Company Incorp.: *See—*
Bachhuber, Theodore J.; and Bachhuber, Philip C., Jr., 3,973,465.
Mazurek, Jury Vatslavovich: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.
MCA Systems, Inc.: *See—*
Stumpf, Richard J.; Watson, Waldon O.; and Leonard, Robert J., 3,973,839.
McAfee, John Gilmore: *See—*
Subramanian, Gopal; and McAfee, John Gilmore, 3,974,268.
McAllister, Jack G. Method of making a frame assembly. 3,973,370, Cl. 52-745.000.
McAlpin, James J.: *See—*
Brumbaugh, Kenneth H.; and McAlpin, James J., 3,974,237.
McCalmont, David: *See—*
Brand, Lawrence W.; Barbieri, Thomas; and McCalmont, David, 3,973,675.
McCarroll, Alan F., to Xerox Corporation. Latching mechanism for the backup roll of a roll fuser employed in a copier apparatus. 3,973,844, Cl. 355-3.00R.
McCarty, James C.; and Monaco, George, to Syntex (U.S.A.) Inc. Screening device in a closed-loop aquaculture system. 3,973,519, Cl. 119-3.000.
McClure, Robert E.: *See—*
Browning, Iben; and McClure, Robert E., 3,973,760.
McCreery, James F.; and Jones, Dennis G., to Kennametal Inc. Cutting insert. 3,973,307, Cl. 29-95.00R.
McCulloch, Charles R.; and Gill, Robert C., to United States of America, Navy. Submersible object having drag reduction and method. 3,973,510, Cl. 114-67.00A.
McCullough, Glenn R.: *See—*
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., 3,974,091.
McFarland, Robert H.: *See—*
Caselani, Richard E.; Gilliom, John W.; McFarland, Robert H.; and Perl, Richard L., 3,973,551.
McGovern, Terrence L.: *See—*
Bates, Alvin G.; and McGovern, Terrence L., 3,974,457.
McGraw-Edison Company: *See—*
Loy, Robert E., 3,974,409.
McGregor, Adam: *See—*
Logan, Robert; and McGregor, Adam, 3,974,020.
McHenry, Edgar Ronald, to Union Carbide Corporation. Process for producing carbon fibers from mesophase pitch. 3,974,264, Cl. 423-447.400.
McIntyre, John E.: *See—*
Coltrin, Robert E.; Eakins, Thomas C.; and McIntyre, John E., 3,973,745.
McKenzie, John H., to Agritec Co. Self-contained hydrophilic plant growth matrix and method. 3,973,355, Cl. 47-37.000.
McKinnon, Eugene T.; Drutz, Alvin S.; Danta, Randall C.; and Zetterberg, Niklas F., to McKinnon, Eugene T.; and Drutz, Alvin S., a part interest to each. Piercing valve for tapping pipelines. 3,973,584, Cl. 137-318.000.
McLaughlin, James H.: *See—*
Bajek, Walter A.; and McLaughlin, James H., 3,974,064.
McMahan, Richard C. Trailer washing apparatus. 3,973,988, Cl. 134-46.000.
McQuade, James M.: *See—*
Lupinski, John H.; and McQuade, James M., 3,974,324.
McVey, Charles I.: *See—*
Collins, Byron R.; and McVey, Charles I., 3,974,410.
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, to AGFA-Gevaert, A.G. Color photographic materials containing diffusion fast pyrazolone couplers. 3,973,979, Cl. 96-100.000.
Meiji Seika Kaisha, Ltd.: *See—*
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., to Hallmark Cards, Incorporated. Method for transferring design image to wax articles. 3,974,014, Cl. 156-240.000.
Melchinger, Wilhelm, to Daimler-Benz Aktiengesellschaft. Vane-type pump or motor with undervane fluid bias. 3,973,881, Cl. 418-81.000.
Menz, Fredric L.: *See—*
Anderson, Matthew E.; and Menz, Fredric L., 3,973,499.
Merc-O-Tronic Instruments Corporation: *See—*
Crouch, Thomas J.; and Hait, Larry G., 3,974,445.
Merck & Co., Inc.: *See—*
Beattie, Thomas R.; and Christensen, Burton G., 3,974,151.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,974,212.
Polli, Gerald P.; and Shoop, Clyde E., 3,974,272.
Remy, David C., 3,974,285.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Erdmann, Dietrich; Schneider, Gerhart; and Koch, Wolfgang, 3,973,944.
Merco Products, Inc.: *See—*
Zumbro, David J., 3,973,656.
Mersich, Laszlo, to Telefonaktiebolaget L M Ericsson. Electronic speech circuit for a central battery telephone set. 3,974,344, Cl. 179-81.00A.
Mettler Instruments AG: *See—*
Kunz, Peter, 3,973,637.
Mettoy Company Limited, The: *See—*
Nicholls, Bryan Frederick, 3,974,469.
Metzer, Karl Georg: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 3,974,140.
Metzger, Karl-Georg: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,141.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,142.
Schrock, Wilfried; Metzger, Karl-Georg; and Konig, Hans-Bodo, 3,974,288.

Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. Vasodilating and antihypertensive compositions and methods of effecting vasodilation and treating hypertension utilizing 2-amino-4H pyrane as the active agent. 3,974,290, Cl. 424-283.000.

Meyer, Horst: *See—*
Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, 3,974,275.

Meyer, Walter E.: *See—*
Sallberg, David W.; and Meyer, Walter E., 3,974,364.

Meyr, Heinrich: *See—*
Rosdolsky, Hans G.; and Meyr, Heinrich, 3,974,326.

Mezzanotte, Mario, to Industrie Pirelli S.p.A. Breaker structures of radial tires. 3,973,612, Cl. 152-361.0FP.

Micafil A.G.: *See—*
Fuchs, Heinz, 3,974,314.

Micchelli, Albert L.; Nowak, Frank A., Jr.; and Legato, Gerard J., to National Starch and Chemical Corporation. Hair coloring composition containing a water-soluble cationic polymer and a process for use thereof. 3,973,901, Cl. 8-10.100.

Michel, Eberhard, to Siemens Aktiengesellschaft. Nuclear reactor installation. 3,974,027, Cl. 176-38.000.

Michelsen, Edwin R. Electric hoists. 3,973,448, Cl. 74-421.00R.

Microfilm Enterprises Corporation: *See—*
Schankler, Martin M., 3,973,740.

Microwave Associates, Inc.: *See—*
White, Joseph F., 3,974,465.

Mielke, Klaus Heinrich, to Oscar Adolf Engelbert Wallmark. Printing unit particularly intended for price labelling machines. 3,973,488, Cl. 101-110.000.

Mies, Carl P., to Mies Filter Products, Inc. Apparatus for cooking chicken. 3,973,481, Cl. 99-408.000.

Mies Filter Products, Inc.: *See—*
Mies, Carl P., 3,973,481.

Mifuji Iron Works, Ltd.: *See—*
Ito, Shozo, 3,973,924.

Mihalisin, John Raymond: *See—*
Bieber, Clarence George; Mihalisin, John Raymond; and Galka, John Joseph, 3,973,952.

Mikhailov, Vladimir Vladimirovich: *See—*
Ulyanitsky, Evgeny Mefodievich; Streltsov, Vladimir Semenovich; Belichenko, Vladimir Ivanovich; and Mikhailov, Vladimir Vladimirovich, 3,974,423.

Miles, Earl F., Jr., to Indy Lighting, Inc. Adjustable light fixture. 3,974,371, Cl. 240-73.0BJ.

Miles, Howard Price. Torque-limiting couplings. 3,973,412, Cl. 64-28.00R.

Miles, James A., to Monsanto Company. Preparation of substituted phenyl phosphonous dichlorides. 3,974,217, Cl. 260-543.00P.

Miles Laboratories, Inc.: *See—*
Snell, Raymond Lee, 3,974,036.
Sternberg, Moshe, 3,974,134.
Van der Werf, Loren John; and Rapkin, Myron Colman, 3,973,909.

Miles, Leon H., to Atlantic Richfield Company. Well completion in permafrost. 3,973,626, Cl. 166-250.000.

Miller, Franz-Friedrich: *See—*
Endres, Horst; Hertel, Otto; and Miller, Franz-Friedrich, 3,973,904.

Miller, Jerry E., to Globe Tool and Engineering Company, The. Armature winding and leading connecting machine. 3,973,738, Cl. 242-7.05B.

Miller, Leo S.; and Wenninger, Freddie W., to Hewlett-Packard Company. Speed invariant decoding of digital information from a magnetic tape. 3,974,523, Cl. 360-40.000.

Miller, Richard Carrel: *See—*
Chemelli, Robert Guido; and Miller, Richard Carrel, 3,974,507.

Milliken, Paul E. Toy karate device. 3,973,772, Cl. 272-76.000.

Millmaster Onyx Corporation: *See—*
Dudzinski, Zdzislaw; and Wakeman, Reginald L., 3,974,208.

Minaga, Masahiro: *See—*
Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, 3,974,232.

Minagawa, Motoi, administrator: *See—*
Minagawa, Toyosaku, deceased; Hazaka, Yuzi; and Umezawa, Fumio, 3,973,574.

Minagawa, Toyosaku, deceased (by Minagawa, Motoi, administrator); Hazaka, Yuzi; and Umezawa, Fumio, to Umezawa, Fumio. Waving and straightening hair by producing metal chelates in the keratin of the hair. 3,973,574, Cl. 132-7.000.

Minkow, Julius M. Dispensing tray for glue machine. 3,973,516, Cl. 118-262.000.

Minnesota Mining and Manufacturing Company: *See—*
Chor, Lawrence C. K., 3,973,824.
Tiers, George V. D.; and Wiese, Joseph A., Jr., 3,974,147.

Minolta Camera Kabushiki Kaisha: *See—*
Matsumoto, Toshiaki, 3,974,511.
Ogura, Toshinobu; and Nakamura, Akiyoshi, 3,973,832.

Minoura, Kazuo, to Canon Kabushiki Kaisha. Symmetrical lens system affording variable magnification. 3,973,831, Cl. 350-184.000.

Mischutin, Vladimir, to White Chemical Corporation. Flame retardants for synthetic materials (I). 3,974,310, Cl. 427-390.000.

Mistretta, Charles A.; and Kelcz, Frederick, to Wisconsin Alumni Research Foundation. Differential X-ray method and apparatus. 3,974,386, Cl. 250-402.000.

Mitchell, Robert S., to Monsanto Company. Imino alkylimino phosphonates and method for preparing and using same. 3,974,090, Cl. 252-389.00A.

Mitchell, Robert S., to Monsanto Company. Substituted tertiary amines and processes for preparing the same. 3,974,209, Cl. 260-502.500.

Mitsubishi Chemical Industries Ltd.: *See—*
Yamada, Hideaki; Kumagai, Hidehiko; and Ohkishi, Haruyiki, 3,974,031.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Ohkawa, Kiyoto; Watanabe, Osamu; and Nakamura, Yoshiteru, 3,974,497.
Saito, Nagao; Kobayashi, Kazuhiko; and Oizumi, Toshiro, 3,974,357.
Yamazaki, Eizo; and Watanabe, Osamu, 3,974,494.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, 3,974,206.

Mitsubishi Petrochemical Company Limited: *See—*
Koga, Michio; and Sato, Hideo, 3,974,236.

Mitumori, Yoshio: *See—*
Shigemori, Youjiro; and Mitumori, Yoshio, 3,974,499.

Miwa, Keiichi: *See—*
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, 3,974,467.

Miyakawa, Jimmie; and Degnan, Donald E. Security viewing device. 3,973,835, Cl. 350-319.000.

Miyatake, Masayuki; Ishizuka, Sengo; and Takagi, Takao, to Toyo Ink Manufacturing Co., Ltd. Pigment compositions. 3,973,981, Cl. 106-288.00Q.

Mizrahi, Joseph; and Barnea, Eli, to IMI(TAMI) Institute for Research and Development. Liquid-liquid mixer. 3,973,759, Cl. 259-8.000.

Mobil Oil Corporation: *See—*
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,062.
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,063.
Sarli, Peter Geoffrey, 3,973,623.

Moeller, Wolfgang W. Ceiling tile assembly. 3,973,368, Cl. 52-476.000.

Moergeli, Walter Rudolf: *See—*
James, George Stephen; Dewar, Bruce Ian; and Moergeli, Walter Rudolf, 3,974,049.

Mollard, Maurice, to F.T.F. Inertia braking device for a road trailer, with cancellation of the braking action when reversing. 3,973,655, Cl. 188-328.000.

Moller, Willi; and Stamm, Otto. Electrode cell assembly for the continuous determination of ion concentrations in living tissues. 3,973,555, Cl. 128-2.00E.

Monaco, George: *See—*
McCarty, James C.; and Monaco, George, 3,973,519.

Monahan, Jack J.: *See—*
Lesyk, Joseph N.; Ludwig, David P.; and Monahan, Jack J., 3,973,714.

Monarch Marking Systems, Inc.: *See—*
Keefe, Jack D., 3,973,299.
Strausburg, Larry D., 3,973,710.

Monroe, Neil J.: *See—*
Keller, Arthur; and Monroe, Neil J., 3,973,523.

Monsanto Company: *See—*
Berggren, L. John; and Reilly, Joseph R., 3,973,897.
Campbell, Robert Henry; and Sullivan, Alfred Bay, 3,974,170.
Coran, Aubert Yaucher; and Kerwood, Joseph Edward, 3,974,163.
Familant, Harold M., 3,973,387.
Miles, James A., 3,974,217.
Mitchell, Robert S., 3,974,090.
Mitchell, Robert S., 3,974,209.
Ott, John B., 3,974,297.
Yu, Jing-Peir, 3,973,383.
Yu, Jing-peir, 3,973,384.

Montag, Mordechai. Hydrostatic gas bearing systems. 3,973,810, Cl. 308-9.000.

Montenbruck, Stephen. Paper conveying system. 3,973,770, Cl. 271-272.000.

Montgomery, Anthony J., to Xerox Corporation. Imaging method including exposure of photoconductive imaging member through lenticular lens element. 3,973,953, Cl. 96-1.00R.

Montgomery, Anthony J., to Xerox Corporation. Imaging method including exposure of deformation imaging member through lenticular lens element. 3,973,957, Cl. 96-1.100.

Moog Music, Inc.: *See—*
Luce, David A., 3,974,461.

Mooi, John: *See—*
Erickson, Henry; and Mooi, John, 3,974,255.

Moon, James: *See—*
Decker, Elmer L.; and Moon, James, 3,973,435.

Moore, Lionel G., Jr.; and Flynn, Thomas P., to Super Products Corporation. Dust filtration system. 3,973,935, Cl. 55-302.000.

Moore, Thomas W.: *See—*
Patel, Bahechar S.; and Moore, Thomas W., 3,974,437.

Moore, W. Edward C., to VPI Educational Foundation. Method and apparatus for automatically injecting the fluid contents of a plurality of pre-loaded syringes into a gas chromatograph or the like. 3,973,696, Cl. 222-1.000.

Moore, Zack J.; and Goode, John V., Jr., to Dow Chemical Company, The. Method and apparatus for measuring particulate concentration in the atmosphere. 3,973,852, Cl. 356-207.000.

Moran, Marius R.: *See—*
Kenkare, Divaker B.; and Moran, Marius R., 3,974,270.

Morcom, William R.: *See—*
Sanders, Thomas J.; Davis, Jacob A.; and Morcom, William R., 3,974,517.

Morgan Construction Company: *See—*
Woodrow, Harold E., 3,973,425.

Morgan, Peter E. D.: *See—*
Staut, Ronald; and Morgan, Peter E. D., 3,974,108.

Mori, Yasuharu, to Rengo Co., Ltd. Paper roll diameter sensing device for use with paper splicing apparatus. 3,974,490, Cl. 340-268.000.

Morii Chokoku Co., Ltd.: *See—*
Kajimoto, Isamu; and Morii, Hideaki, 3,973,485.

Morii, Hideaki: *See—*
Kajimoto, Isamu; and Morii, Hideaki, 3,973,485.

Morimoto, Kazuhisa: *See—*
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, 3,973,830.

Morita, Masato; and Morita, Reiko, to International Nuclear Fuel Co., Ltd. Method of producing excited states of atomic nuclei. 3,974,390, Cl. 250-492.00R.

Morita, Reiko: *See—*
Morita, Masato; and Morita, Reiko, 3,974,390.

Moro, Brigitte: *See—*
Siebke, Hans; Moro, Brigitte; Schonborn, Manfred; and Jahnke, Horst, 3,974,040.

Morrison, Howard J.; Hicks, Alan; and Kuna, Wayne A., to Marvin Glass & Associates. Hand printing stamp. 3,973,494, Cl. 101-373.000.

Morrison, Jim H.: *See—*
Parker, Bruce W.; Morrison, Jim H.; and Noble, Arliss B., 3,973,503.

Morton-Norwich Products, Inc.: *See—*
Schwan, Thomas J., 3,974,169.

Moscatello, Charles L.: *See—*
Cheney, Richard F.; Moscatello, Charles L.; and Mower, Frederick J., 3,974,245.

Moser, Thomas D.: *See—*
Hummert, George T.; Moser, Thomas D.; Edison, David M.; and Kurland, Marvin, 3,973,648.

Moser, Willard W. Tie down brackets for flexible members. 3,973,298, Cl. 24-146.000.

Moses, Bernice, to Lawrence Peska Associates, Inc., a part interest. Incontinent's bed wrap. 3,973,276, Cl. 2-215.000.

Moshkovich, Alexandr Bentsionovich: *See—*
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Motorola, Inc.: *See—*
Davis, William Folsom, 3,974,404.
Maeder, Heinz B., 3,974,451.

Mott Company, The: *See—*
Darling, Raymond A., 3,973,657.

Moulton, Clifford C., Sr.: *See—*
Leopold, Donald L.; and Moulton, Clifford C., Sr., 3,973,660.

Mower, Frederick J.: *See—*
Cheney, Richard F.; Moscatello, Charles L.; and Mower, Frederick J., 3,974,245.

Mueller, Richard J.: *See—*
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 3,974,352.

Mugele, Kurt, to Siemens Aktiengesellschaft. Side-channel ring compressor. 3,973,865, Cl. 415-53.00T.

Muhling, Alois; and Schmidt, Helmut, to Siemens Aktiengesellschaft. Timing relay having an electric motor device. 3,973,443, Cl. 74-3.500.

Muir, David Donald: *See—*
Cauvain, Stanley Peter; Hodge, Donald Gordon; Muir, David Donald; and Dodds, Norman James Harold, 3,974,298.

Muller, Ewald, to ITT Industries, Inc. Two-way valve for a brake booster. 3,973,593, Cl. 137-627.500.

Muller, Gerd, to Jenaer Glaswerk Schott & Gen. Glass ceramic as filler in polymerizable dental filling compositions. 3,973,972, Cl. 106-39.700.

Mullin, John P.: *See—*
Anderson, Andrew W.; and Mullin, John P., 3,973,374.

Multi-Slide Corporation Ltd.: *See—*
Frankel, Hugh, 3,973,344.

Munchenberg, Gunter: *See—*
Weber, Otto; Hartwig, Horst; and Munchenberg, Gunter, 3,973,653.

Murakami, Yoshinobu: *See—*
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, 3,973,830.

Murata Kikai Kabushiki Kaisha: *See—*
Teranishi, Junichi, 3,973,381.

Murata, Yorihiro, to Carborundum Company, The. Closed cellular fused silica bodies. 3,974,315, Cl. 428-212.000.

Murayama, Yoichi. High vacuum ion plating device. 3,974,059, Cl. 204-298.000.

Murphy, James A.: *See—*
Chen, Shih-Lu; and Murphy, James A., 3,974,246.

Murray, Gordon Arthur William: *See—*
Semple, James Campbell; and Murray, Gordon Arthur William, 3,973,277.

Musnitskas, Juozas-Romanas Juozo: *See—*
Noreika, Rimas-Kazimeras Mechislovo; Musnitskas, Juozas-Romanas Juozo; Lesene, Iolanta Vladimiro; and Zdanavichjus, Ionas Iona, 3,974,139.

Musselman, James R.: *See—*
Janssen, Roger G.; and Schantzen, Wayne G., 3,973,808.

Mutterer, Francis, to Ciba-Geigy Corporation. Process for the manufacture of bromopyridines. 3,974,166, Cl. 260-290.0HL.

Myascedov, Dmitry Nikolaevich: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.

Myers, Gene Edward, to Lawrence Peska Associates, Inc., a part interest. Hand held aerosol can application. 3,973,853, Cl. 401-190.000.

Naarden International, N.V.: *See—*
Boelens, Harmannus, 3,974,201.

Nadler, Donald; and Witzmann, Carl F., to National Starch and Chemical Corporation. Foil laminating adhesive. 3,974,112, Cl. 260-4.00R.

Nagano, Masashi, to Shimano Industrial Company, Limited. Derailleur for a bicycle. 3,973,447, Cl. 74-242.11B.

Nagasaka, Masuo, to Konan Camera Research Institute. Sustaining device. 3,973,748, Cl. 248-280.000.

Nagayama, Masuzo: *See—*
Isa, Hiroshi; Inagaki, Takeo; Kiyonaga, Yasuhiro; and Nagayama, Masuzo, 3,974,194.
Okumura, Osamu; Yaguchi, Katsumi; Adachi, Ikuo; and Nagayama, Masuzo, 3,974,211.

Nagazumi, Yasuo, to Nissan Motor Co., Ltd. Mechanical energy absorbing device and safety harness using the same. 3,973,650, Cl. 188-1.00C.

Nagumo, Shin-ichi: *See—*
Sugihara, Kunihiko; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 3,973,535.

Naka, Hiromitsu. Clothes drying device. 3,973,677, Cl. 211-97.000.

Nakada, Masahiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for promoting a vaporization of a fuel for an internal combustion engine. 3,973,543, Cl. 123-141.000.

Nakagawa, Katsuyuki: *See—*
Nakamura, Yoshiatsu; Nozawa, Hisato; Isomura, Takuji; and Nakagawa, Katsuyuki, 3,973,541.

Nakagawa, Koji; and Hirano, Kenkiti, to Denki Kagaku Kogyo Kabushiki Kaisha. Method for execution of quick hardening cement. 3,973,978, Cl. 106-95.000.

Nakajima, Yasuo: *See—*
Sugihara, Kunihiko; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 3,973,535.

Nakamura, Akiyoshi: *See—*
Ogura, Toshinobu; and Nakamura, Akiyoshi, 3,973,832.

Nakamura, Chihiro: *See—*
Tanigawa, Shizuhiko; Yamazoe, Yoshinori; and Nakamura, Chihiro, 3,974,017.

Nakamura, Ryuichi; Fukuhara, Seiji; Matsumoto, Shuichi; and Komatsu, Koei, to Japan Synthetic Rubber Co., Ltd. Method for disproportionating ethylenically unsaturated compounds having functional ester groups. 3,974,196, Cl. 260-410.90R.

Nakamura, Yoshiatsu; Nozawa, Hisato; Isomura, Takuji; and Nakagawa, Katsuyuki, to Kabushiki Kaisha Komatsu Seisakusho. Governor for use in fuel injection pump. 3,973,541, Cl. 123-140.00R.

Nakamura, Yoshiteru: *See—*
Ohkawa, Kiyoto; Watanabe, Osamu; and Nakamura, Yoshiteru, 3,974,497.

Nakane, Jun, to Sekisui Jushi Kabushiki Kaisha; and Bandamatic System Service Kabushiki Kaisha. Packing case and apparatus for producing the same. 3,973,721, Cl. 229-30.000.

Nakanishi, Michio; Oe, Takanori; and Tsuruda, Mineo, to Yoshitomi Pharmaceutical Industries, Ltd. Tricycle substituted acetones. 3,974,168, Cl. 260-295.00T.

Nakano, Masaaki: *See—*
Izura, Yoshiteru; Okano, Keisuke; and Nakano, Masaaki, 3,974,420.

Nakano, Tatsumi: *See—*
Fukatsu, Motonori; and Nakano, Tatsumi, 3,974,522.

Nakasugi, Hajime: *See—*
Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, 3,973,999.

Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, to Nippon Steel Corporation. Method for producing a high tensile strength and high toughness bend pipe. 3,973,999, Cl. 148-12.00R.

Nakazawa, Mitsunobu: *See—*
Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, 3,974,041.

Naley, Lowell B.; Haberkorn, Robert W.; and Leinum, Virgil D., to Westinghouse Electric Corporation. Electronic capacity control or direct expansion refrigeration of air conditioning systems. 3,973,618, Cl. 165-27.000.

Narimatsu, Yoshitsugu: *See—*
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.

Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, to Idemitsu, Kosan Kabushiki-Kaisha. Process and apparatus for continuous production of polycarbonates. 3,974,126, Cl. 260-47.0XA.

National Catheter Corporation: *See—*
Sheridan, David S.; and Jackson, Isaac S., 3,973,569.

National Forge Company: *See—*
Crum, Andrew Stephenson Dalgleish, 3,973,886.

National Semiconductor Corporation: *See—*
Russell, Ronald W.; and Black, Kyle M., 3,974,456.

National Starch and Chemical Corporation: *See—*
Micchelli, Albert L.; Nowak, Frank A., Jr.; and Legato, Gerard J., 3,973,901.
Nadler, Donald; and Witzmann, Carl F., 3,974,112.

National Steel Corporation: *See—*
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 3,973,679.

Natori, Minoru: *See—*
Yoshida, Masateru; and Natori, Minoru, 3,973,388.

Nayler, John Herbert Charles; Pearson, Michael John; and Southgate, Robert, to Beecham Group Limited. 3-Benzyl-7-amino-3-cephem-4-carboxylic acid, the tertiary butyl ester, or the pharmaceutically acceptable salts thereof. 3,974,154, Cl. 260-243.00C.

NCR Corporation: *See—*
Pratt, John W., Jr.; and Filsinger, David E., 3,973,707.

Neff, Dieter Klaus, to International Business Machines Corporation. Pick up assembly for fragile devices. 3,973,682, Cl. 214-1.0BT.

Nelson, Jerome W.; and Randolph, James B., to CRC-Crose International, Inc. Multiple arc welding device and method. 3,974,356, Cl. 219-60.00A.

Nemcek, Josef; and Heap, Nicholas, to Imperial Chemical Industries Limited. Method of polymerizing ethylenically unsaturated materials by irradiation and composition for use therein. 3,974,053, Cl. 204-159.150.

Nemcek, Jozef: *See—*
Heap, Nicholas; and Nemcek, Jozef, 3,974,052.

Nesbitt, George G., to Denver Wood Products Co. Display brackets. 3,973,678, Cl. 211-106.000.

Nesmith, Charles A., Jr. Microfilm storage device. 3,973,813, Cl. 312-204.000.

Nestle Company Inc., The: *See—*
Augeri, Joseph L., 3,973,941.

Nettli, Per Oscar. Process for the dehydration of fatty sludge and the recovery of chemicals. 3,974,069, Cl. 210-45.000.

Nevrkla, Johann Leopold: *See—*
Gallacher, John David; Nevrkla, Johann Leopold; and Judd, David Walter, 3,973,326.

New Mexico Tech Research Foundation: *See—*
Colgate, Stirling A., 3,973,628.

Newcomb, Robert K.: *See—*
Staats, Henry N.; and Newcomb, Robert K., 3,973,787.

Newell, Dennis E.: *See—*
Tyler, Hugh J.; and Newell, Dennis E., 3,974,430.

Newton, Albert E.; Farnum, Roger L.; and Gelsomini, Nicholas J., to USM Corporation. Methods of stiffening a shoe component. 3,973,284, Cl. 12-146.00D.

Nicholls, Bryan Frederick, to Mettoy Company Limited, The. Permanent magnet biasing means for reed switches. 3,974,469, Cl. 335-153.000.

Nichols, Philip E.: *See—*
Trafton, John E.; Nichols, Philip E.; and Haynes, Royce, 3,973,912.

Niehaus, Howard E.: *See—*
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 3,973,679.

Nierenberg, William A.; and Pontius, Rex B., to United States of America, Energy Research and Development Administration. Apparatus for diffusion separation. 3,973,928, Cl. 55-16.000.

Nierenberg, William A., to United States of America, Energy Research and Development Administration. Apparatus for diffusion separation. 3,973,934, Cl. 55-158.000.

Nieuwenhoven, Hendricus Jacobus Cornelis: *See—*
van der Lely, Cornelis; and Nieuwenhoven, Hendricus Jacobus Cornelis, 3,973,680.

Nigrosh, Alvin L., to Hoague-Sprague Corporation. Box forming machine. 3,973,475, Cl. 93-36.300.

Niida, Taro: *See—*
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.

Niimura, Tsutomu: *See—*
Hongu, Masayuki; and Niimura, Tsutomu, 3,974,460.

Niklas, Hans: *See—*
Krug, Hans; Niklas, Hans; and Thornblad, Rolf, 3,973,992.

Nilgens, Heinrich; Ostertag, Karl; and Scheiber, Herbert, to Akzona Incorporated. Winding apparatus. 3,973,739, Cl. 242-18.00R.

Nilsson, Claes Torsten, to Aktiebolaget Platmanufaktur. System for assorting solid waste material and preparation of same for recovery. 3,973,736, Cl. 241-76.000.

Nilsson, Hans Robert; and Pamlin, Roland, to Svenska Rotor Maskiner Aktiebolag. Rotary internal combustion engine. 3,973,527, Cl. 123-8.470.

Ninomiya, Satoshi: *See—*
Iizuka, Nobuyuki; Hisano, Katsukuni; Ninomiya, Satoshi; and Otawara, Yasuhiko, 3,973,404.

Nippon Electric Company, Ltd.: *See—*
Kageyama, Takao; and Kato, Hiroshi, 3,974,417.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Griffith, Glen R.; and Deutsch, Ralph, 3,974,478.
Uchiyama, Yasuji, 3,973,462.

Nippon Soda Company Ltd.: *See—*
Fujino, Akiharu; Iwataki, Isao; and Hirono, Yoshihiko, 3,973,945.

Nippon Steel Corporation: *See—*
Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, 3,973,999.

Nishide, Katsuhiko: *See—*
Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, 3,974,041.

Nishikawa, Masao; Toshimitsu, Yoshihiko; and Aoki, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Power steering apparatus for a vehicle. 3,973,640, Cl. 180-132.000.

Nishitani, Hiroshi: *See—*
Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, 3,974,126.

Nissan Motor Co., Ltd.: *See—*
Chiba, Keiichi, 3,973,581.
Nagazumi, Yasuo, 3,973,650.
Shimizu, Kazuaki; and Toshida, Shunichi, 3,973,652.
Sugihara, Kunihiko; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, 3,973,535.

Nitro-Nobel A.B.: *See—*
Persson, Ingemar Per, 3,973,498.

NL Industries, Inc.: *See—*
Cestaro, John P.; and Sokolov, Uriel, 3,973,991.

Noble, Arliss B.: *See—*
Parker, Bruce W.; Morrison, Jim H.; and Noble, Arliss B., 3,973,503.

Noguera, John Michael. Ball bearing rollers for ring spinning machines. 3,973,811, Cl. 308-189.00R.

Nolan, James F.: *See—*
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., 3,973,815.

Nolan, James J.: *See—*
Markowski, Stanley J.; and Nolan, James J., 3,973,395.

Nomoto, Masao: *See—*
Ito, Kanichi; Hirayama, Yoshio; Takeuchi, Ryoichi; and Nomoto, Masao, 3,973,735.

Noorily, Peter, to Thomas & Betts Corporation. Bundling strap. 3,973,293, Cl. 24-16.0PB.

Noranda Mines Limited: *See—*
Pelletier, Albert; and Hallett, Geoffrey D., 3,973,761.

Nord, Eric T.: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 3,973,697.

Nordson Corporation: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 3,973,697.

Noreika, Rimas-Kazimeras Mechislovo; Musnitskas, Juozas-Romanas Juozo; Lesene, Iolanta Vladimiro; and Zdanavichjus, Ionas Iona. Diethylaminohydroxypropyl cellulose I or II and a method for preparing same. 3,974,139, Cl. 536-84.000.

Norris Industries, Inc.: *See—*
Beisch, Hans R.; and Marks, Harold C., 3,973,801.

North Electric Company: *See—*
Cheney, Thomas K.; and Kuczura, Anatol, 3,974,343.

Northwest Molded Products Corporation: *See—*
Nyitray, William; and Francke, Robert L., 3,973,758.

Norton, Christopher Stephen: *See—*
Emson, Stephen Derek; Norton, Christopher Stephen; and Wilson, James Royston, 3,974,026.

Norton Company: *See—*
Richerson, David W., 3,974,106.

Nosco Plastics, Inc.: *See—*
Cloyd, Harold S., 3,973,692.

Notari, Bruno: *See—*
Rivola, Luigi; and Notari, Bruno, 3,974,216.

Nott, Alan J., to Anglo-American Clays Corporation. Method for improving clay brightness utilizing magnetic separation. 3,974,067, Cl. 209-3.000.

Novy, Donald A. Piston valved brass-wind musical instrument. 3,973,464, Cl. 84-392.000.

Nowak, Frank A., Jr.: *See—*
Micchelli, Albert L.; Nowak, Frank A., Jr.; and Legato, Gerard J., 3,973,901.

Nozawa, Hisato: *See—*
Nakamura, Yoshiatsu; Nozawa, Hisato; Isomura, Takuji; and Nakagawa, Katsuyuki, 3,973,541.

Nuclear Power Company (Whetstone) Limited: *See—*
George, Brian Victor; and Cook, Reginald Kenneth, 3,974,029.

Nucleus, Inc., The: *See—*
Coffey, David L., 3,974,088.

Nyitray, William; and Francke, Robert L., to Northwest Molded Products Corporation. Conveying and mixing apparatus. 3,973,758, Cl. 259-6.000.

Nylonge Corporation: *See—*
Alibeckoff, Galib-bey Atam, 3,974,319.

Oberlies, Robert H.: *See—*
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, 3,974,330.

Obermeier, Albert Anthony; and Thompson, James Edward, to Deere & Company. Seat backrest having an adjustable lumbar support. 3,973,797, Cl. 297-284.000.

Oberschwabische Metallwarenfabrik GmbH & Co. KG: *See*—
Tess, Peter, 3,973,694.

O'Brien, Edward M., to Iowa State University Research Foundation, Inc. Speech processing system. 3,974,336, Cl. 179-1.0SA.

Oe, Takanori: *See*—
Nakanishi, Michio; Oe, Takanori; and Tsuruda, Mineo, 3,974,168.

Offermann, Bernd Peter, to Licentia Patent-Verwaltungs-G.m.b.H. High energy electron irradiation of flowable materials. 3,974,391, Cl. 250-492.00B.

Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See*—
Rabinovitch, Maurice; and Bibring, Herve, 3,973,750.

Ogawa, Akira: *See*—
Shiba, Keisuke; Hinata, Masanao; Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, 3,973,969.

Ogawa, Katsuyoshi: *See*—
Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, 3,974,206.

Ogawa, Yasuaki: *See*—
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.

Ogishima, Katsuharu: *See*—
Narita, Yoshihiro; Konuma, Hideo; Nishitani, Hiroshi; Komori, Norio; and Ogishima, Katsuharu, 3,974,126.

Ogle, Terry Richard. Arrow quiver and pack frame. 3,973,776, Cl. 224-1.00B.

Ogura, Toshinobu; and Nakamura, Akiyoshi, to Minolta Camera Kabushiki Kaisha. Retro-focus type wide angle lens system. 3,973,832, Cl. 350-214.000.

Ohba, Kazunori: *See*—
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.

Ohkawa, Kiyoto; Watanabe, Osamu; and Nakamura, Yoshiteru, to Mitsubishi Denki Kabushiki Kaisha. Display device. 3,974,497, Cl. 340-337.000.

Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, to Sumitomo Chemical Company, Limited. Naphthostyril cationic dyes. 3,974,178, Cl. 260-326.50B.

Ohkishi, Haruyiki: *See*—
Yamada, Hideaki; Kumagai, Hidehiko; and Ohkishi, Haruyiki, 3,974,031.

Ohnishi, Kozi: *See*—
Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, 3,974,232.

Ohno, Genji; and Inoue, Eiichi. Electrostatic developing method. 3,973,955, Cl. 96-1.0LY.

Ohsawa, Mitsuo, to Sony Corporation. Stereophonic signal demodulator for a pair of composite signals with different AC signal levels and the same DC signal level. 3,974,453, Cl. 329-50.000.

Ohtomo, Koichiro; and Yoshimura, Takuji, to Kanebo, Ltd. Alkali resistant glass compositions and alkali resistant glass fibers prepared therefrom. 3,973,974, Cl. 106-50.000.

Ohtsuka, Tetsuro: *See*—
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, 3,973,830.

Oishi, Isamu: *See*—
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, 3,974,467.

Oizumi, Toshiro: *See*—
Saito, Nagao; Kobayashi, Kazuhiko; and Oizumi, Toshiro, 3,974,357.

Okada, Masanori: *See*—
Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, 3,974,000.

Okaniwa, Tetsuo: *See*—
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.

Okano, Keisuke: *See*—
Izura, Yoshiteru; Okano, Keisuke; and Nakano, Masaaki, 3,974,420.

Okeley, Robert E., II: *See*—
Cerny, Daryl D.; Cannon, Robert W.; Okeley, Robert E., II; and Sannella, Joseph L., 3,973,496.

Okoshi, Toshio: *See*—
Inamura, Keizo; Tatsuno, Tadayoshi; and Okoshi, Toshio, 3,974,306.

Okumura, Osamu; Yaguchi, Katsumi; Adachi, Ikuo; and Nagayama, Masuzo, to Lion Fat & Oil Co., Ltd. Method of manufacturing methallyl sulfonate. 3,974,211, Cl. 260-513.00T.

Olafsen, Karl D., to Falconbridge Nickel Mines Limited. Circuit breaker with automatically adjustable contact pressure. 3,974,349, Cl. 200-82.00R.

Olinkraft, Inc.: *See*—
Marshall, Elmer, 3,973,476.

Oliver, Robert: *See*—
Walmsley, Robert Edwin; Oliver, Robert; and Fisher, Norman Ernest, 3,973,883.

Olle, David A.: *See*—
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,974,277.

Ollivier, Louis A., to Veriflo Corporation. Apparatus for controlling the ratio of flow of two gases. 3,973,579, Cl. 137-100.000.

Olschewski, Armin: *See*—
Ernst, Horst; Brandenstein, Manfred; and Olschewski, Armin, 3,973,659.

Olsen, Charles R. Tube primer. 3,973,502, Cl. 102-86.500.

Olympus Optical Co., Ltd.: *See*—
Uetake, Toshifumi, 3,973,827.

Omori, Shozo. Method for automatically packing goods. 3,973,372, Cl. 53-33.000.

Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, to Kitasato Institute, The. Compound NA-337 and a process for producing the same by fermentation. 3,974,273, Cl. 424-122.000.

Onda, Masayuki: *See*—
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.

Onoda Cement Company, Ltd.: *See*—
Yano, Tsuyoshi; Ichikawa, Kazumasa; Take, Takao; and Sasano, Tetsuro, 3,974,024.

Onoda, Seiichi; Tanaka, Mitsuo; and Imoto, Katsuyuki, to Hitachi, Ltd. Optical wave guide. 3,973,828, Cl. 350-96.0WG.

Onodera, Toshihiro; and Sekikawa, Kazue, to Tokyo Shibaura Electric Co., Ltd. Elastic surface wave apparatus. 3,974,463, Cl. 333-30.00R.

Oosaki, Tatsuo: *See*—
Douri, Hisashi; and Oosaki, Tatsuo, 3,973,312.

Orcutt, Dee R.; and Collier, Kenneth C., to PPG Industries, Inc. Electrically heated transparent laminated glazing unit. 3,974,359, Cl. 219-522.000.

Original Hanau Quarzlampen GmbH: *See*—
Sturm, Walter, 3,974,375.

Orn, Max D.: *See*—
Skinner, Harry W.; and Orn, Max D., 3,973,783.

Orscheln Brake Lever Mfg. Company: *See*—
Hirst, Charles M., Jr.; and Lipshield, Eugene C., 3,973,793.

Oscar Adolf Engelbert Wallmark: *See*—
Mielke, Klaus Heinrich, 3,973,488.

Ostertag, Karl: *See*—
Nilgens, Heinrich; Ostertag, Karl; and Scheiber, Herbert, 3,973,739.

Oswald, Alexis A.; and Barnum, Harry W., to Exxon Research and Engineering Company. Higher dialkyl dimethyl ammonium clay gelling agents for unsaturated polyester compositions. 3,974,125, Cl. 260-40.00R.

Otawara, Yasuhiko: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Ninomiya, Satoshi; and Otawara, Yasuhiko, 3,973,404.

Othmer, Donald F. Wire and steel tube as AC cable. 3,974,398, Cl. 307-147.000.

Otsuka, Shin-Ichiro: *See*—
Kobayashi, Tadao; Yamanoi, Akio; and Otsuka, Shin-Ichiro, 3,974,030.

Ott, John B., to Monsanto Company. Packaging resins. 3,974,297, Cl. 426-106.000.

Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., to Mobil Oil Corporation. Conversion of full range crude oils with low molecular weight carbon-hydrogen fragment contributors over zeolite catalysts. 3,974,062, Cl. 208-74.000.

Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., to Mobil Oil Corporation. Denitrogenating and upgrading of high nitrogen containing hydrocarbon stocks with low molecular weight carbon-hydrogen fragment contributors. 3,974,063, Cl. 208-120.000.

Owen, James E.; and Vogt, J. William, to Harshaw Chemical Company, The. Process for preventing segregation of a component in a mixture of powders. 3,974,089, Cl. 252-384.000.

Owens-Corning Fiberglas Corporation: *See*—
Marzocchi, Alfred; and Leary, David E., 3,973,613.

Owens-Illinois, Inc.: *See*—
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., 3,973,815.
Francel, Josef; King, James E.; and Woulbroun, John M., 3,973,975.

Owens, William E., to Boise Cascade Corporation. Folded blank container including top panel lock tab feature. 3,973,723, Cl. 229-33.000.

Oxy Metal Industries Corporation: *See*—
Tremmel, Robert Arnold, 3,974,044.

Oyama, Satoshi; and Takahashi, Akira, to Yagi Antenna Co., Ltd. Active high Q filter using transistor. 3,974,399, Cl. 307-233.00R.

Pack, James L.: *See*—
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 3,973,679.

Page, Louis J. Contact lenses. 3,973,837, Cl. 351-160.000.

Page, Louis J. Contact lenses. 3,973,838, Cl. 351-160.000.

Paget, Charles J., to Eli Lilly and Company. s-Triazolo [5,1-b]benzothiazoles as fungicidal agents. 3,974,286, Cl. 424-270.000.

Palma, Milton J.: *See*—
Durgan, Virgil R. C.; and Palma, Milton J., 3,973,429.

Palmer, James K.: *See*—
Luh, Nancy N. R.; and Palmer, James K., 3,974,301.

Palmer, Lynn D.: *See*—
Marks, Larry D.; Palmer, Lynn D.; and Jensen, Theodore F., 3,973,778.

Pamlin, Roland: *See*—
Nilsson, Hans Robert; and Pamlin, Roland, 3,973,527.

Panahandeh, Hossein: *See—*
Frohner, Klaus; and Panahandeh, Hossein, 3,974,039.

Pandel-Bradford, Inc.: *See—*
Stevens, James; and Sloaberg, David K., 3,974,312.

Panish, Morton B.: *See—*
Casey, Horace Craig, Jr.; Cho, Alfred Yi; and Panish, Morton B., 3,974,002.

Panzarino, Joseph N., to Corning Glass Works. Electrical heating unit incorporating protective $PbTiO_3$ overglaze. 3,974,360, Cl. 219-543.000.

Papa, Anthony Joseph; and Proops, William Robert, to Union Carbide Corporation. Polyurethanes containing halo-aryl amide-ester polyols. 3,974,109, Cl. 260-2.5AV.

Papot, Michel: *See—*
Toulc'hoat, Alain; and Papot, Michel, 3,973,432.

Parel. Societe Anonyme: *See—*
James, George Stephen; Dewar, Bruce Ian; and Moergeli, Walter Rudolf, 3,974,049.

Park, Joseph: *See—*
Birchall, James Derek; Cowap, David; and Park, Joseph, 3,974,072.

Parker, Bruce W.; Morrison, Jim H.; and Noble, Arliss B., to Westinghouse Electric Corporation. Tow cart safety mechanism. 3,973,503, Cl. 104-172.0BT.

Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., to Shell Oil Company. Fluidized bed regeneration of carbon-contaminated catalysts using gas discharge nozzles of specific dimensions. 3,974,091, Cl. 252-417.000.

Parliment, Thomas Holden, to General Foods Corporation. New color composition. 3,974,197, Cl. 260-439.00R.

Parry, Joseph: *See—*
Coen, Ernesto; Parry, Joseph; and Steere, Robin Charles, 3,973,942.

Parsons, Richmond S.: *See—*
Porter, Carter E.; Parsons, Richmond S.; and Rossiter, Paul H., 3,973,890.

Partyka, Richard Anthony; Holava, Henry Michael; and Beverung, Warren Neil, to Bristol-Myers Company. Hypotensive agents. 3,974,165, Cl. 260-287.0CF.

Patchornik, Abraham; Kalir, Rami; Fridkin, Matityahu; and Warshavsky, Abraham, to Yeda Research & Development Co. Ltd. Modification of polystyrene by Friedel-Crafts reaction with substituted halo ethyl benzenes and haloethylphenols to make supports for solid phase peptide synthesis. 3,974,110, Cl. 260-2.5HB.

Patel, Bahechar S.; and Moore, Thomas W., to AMF Incorporated. Switching circuit for static inverter. 3,974,437, Cl. 321-27.00R.

Patrick, John L. Stock control indicating means. 3,973,514, Cl. 116-133.000.

Patriquin, George P., to Hudson Lock, Inc. Key controlled security apparatus. 3,973,421, Cl. 70-364.00R.

Patriquin, William George, to Gabriel of Canada Limited. Viscosity sensitive valve for shock absorber. 3,973,654, Cl. 188-282.000.

Patronato de Investigacion Cientifica y Tecnica "Juan de la Cierva" del Consejo Superior de Investigaciones Cientificas: *See—*
de la Cuadra Herrera, Antonio; Tallante, Miguel Fernandez; and Sanchez, Armando Rodriguez, 3,974,254.

Pausch, Josef: *See—*
Kwon, Sung Lim; and Pausch, Josef, 3,973,802.

Paverman, Grisha H. Construction of underground dams and equipment therefor. 3,973,408, Cl. 61-35.000.

Pearson, Donald L., to General Electric Company. Prefocused lamp base and fixture. 3,974,370, Cl. 240-41.0BM.

Pearson, Michael John: *See—*
Nayler, John Herbert Charles; Pearson, Michael John; and Southgate, Robert, 3,974,154.

Peck, Cluff: *See—*
Jacobs, G. Richard; Peck, Cluff; and Soderquist, Dean G., 3,973,840.

Pekko, John A.; and Cardenas, Robert J., to Avery International. Undersurface imprintable label construction. 3,973,788, Cl. 282-19.00R.

Pelham, Owen H., Sr., to Woodall Industries Inc. Energy absorbing vehicle body material. 3,974,124, Cl. 260-40.00R.

Pelletier, Albert; and Hallett, Geoffrey D., to Noranda Mines Limited. Furnace tapping apparatus. 3,973,761, Cl. 266-272.000.

Penn, Franklin E.; Fletcher, Walter B.; Rosa, Edmund; and Perina, Joseph, to American Velcro, Inc. Mirrors having stretched reflective sheet materials and method and apparatus for their production. 3,973,834, Cl. 350-310.000.

Pennwalt Corporation: *See—*
Shetty, Bola Vithal; and Thomas, Telfer Lawson, 3,974,157.

Pentel Kabushiki Kaisha: *See—*
Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, 3,974,332.

Pepin, Christian, to Thomson-CSF. Low light level image pick-up tube arrangement. 3,974,331, Cl. 178-7.200.

Peregi, Gyorgy: *See—*
Gygax, Hans-Rudolf; and Peregi, Gyorgy, 3,973,847.

Perego, Emilio, to Compagnia Italiana Montaggi Industriali. Magnetic crawler vehicle for soldering apparatus. 3,973,711, Cl. 228-32.000.

Perforag Ltd.: *See—*
Reich, Walter; and Schaffner, Kurt, 3,973,458.

Perina, Joseph: *See—*
Penn, Franklin E.; Fletcher, Walter B.; Rosa, Edmund; and Perina, Joseph, 3,973,834.

Perl, Richard L.: *See—*
Caselani, Richard E.; Gilliom, John W.; McFarland, Robert H.; and Perl, Richard L., 3,973,551.

Personal Products Company: *See—*
Srinivasan, Subramanian; and Steiger, Fred H., 3,973,567.

Persson, Curt. Sawing apparatus. 3,973,324, Cl. 30-370.000.

Persson, Ingemar Per, to Nitro-Nobel A.B. Initiation device for explosive charge. 3,973,498, Cl. 102-24.00R.

Persson, Jan Edvard; and Ekman, Sven Axel, to Atlas Copco Aktiebolag. Device for feeding a reel along a track. 3,973,634, Cl. 173-147.000.

Peschl, Ivan Anton, to I.P.T. - Institute for Powder Technology. Device for discharging powdery or granular material. 3,973,703, Cl. 222-199.000.

Peter, Martin: *See—*
Steinemann, Samuel; and Peter, Martin, 3,974,001.

Peters, Donald L., to Phillips Petroleum Company. Blow molding apparatus. 3,973,896, Cl. 425-387.00B.

Petersen, Donald Dean, to Deere & Company. Hydrostatic transmission. 3,973,400, Cl. 60-465.000.

Petersen, Ross K. Engine air precleaner. 3,973,937, Cl. 55-449.000.

Peterson, Frank A.: *See—*
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, 3,974,330.

Peterson, Richard J., to C & C Metal Products Corporation. Metal button assembly. 3,973,296, Cl. 24-90.0TA.

Petitpierre, Jean Claude: *See—*
Garner, Robert; and Petitpierre, Jean Claude, 3,974,175.

Petro-Tex Chemical Corporation: *See—*
Barone, Bruno J., 3,974,228.

Petrolite Corporation: *See—*
Lissant, Kenneth J., 3,974,116.

Pews, R. Garth: *See—*
Plonka, James H.; and Pews, R. Garth, 3,974,199.

Pfaender, Lawrence V.: *See—*
Bode, Wolfgang W.; Nolan, James F.; Pfaender, Lawrence V.; Baker, Theodore C.; and Mathias, Richard G., 3,973,815.

Pfarrwaller, Erwin, to Sulzer Brothers Limited. Loom having a cloth take-up system. 3,973,598, Cl. 139-304.000.

Pfarrwaller, Erwin, to Sulzer Brothers Limited. Loom having a cloth take-up system. 3,973,599, Cl. 139-304.000.

Pfizenmaier, Walter. Closure strip for flexible-walled containers. 3,973,294, Cl. 24-30.50T.

Pfizer Inc.: *See—*
Althuis, Thomas H.; Czuba, Leonard J.; Hess, Hans-Jurgen E.; and Kadin, Saul B., 3,974,161.
Cross, Peter Edward; and Gadsby, Brian, 3,974,155.
Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,974,213.

Phillips, David C.: *See—*
Smith, James D. B.; and Phillips, David C., 3,973,438.
Smith, James D. B.; and Phillips, David C., 3,973,439.

Phillips Petroleum Company: *See—*
Kubicek, Donald H., 3,974,100.
Peters, Donald L., 3,973,896.
Witt, Donald R., 3,974,101.

Phillips, Robert R.: *See—*
Bock, Jan; Lundberg, Robert D.; Phillips, Robert R.; and Makowski, Henry S., 3,974,240.
Lundberg, Robert D.; Phillips, Robert R.; Westerman, Lowell; and Bock, Jan, 3,974,241.

Phipps, Derek John, to Decca Limited. Phase comparison radio navigation system receiver having phase memory oscillators for phase locking to time-sequentially received transmissions. 3,974,502, Cl. 343-105.00R.

Phipps, Derek John, to Decca Limited. Phase comparison radio navigation system with time-sequenced transmissions from spaced stations using selectable phase memory oscillators in a receiver. 3,974,503, Cl. 343-105.00R.

Pickle, Jack L.: *See—*
Breck, William Louis, Jr.; and Pickle, Jack L., 3,973,658.

Pickles, Joseph, to Ferro Manufacturing Corporation. Seat recliner. 3,973,288, Cl. 16-146.000.

Pietzsch, Siegfried; and Schaeffer, Georg, to Hoechst Aktiengesellschaft. Process for the manufacture of anhydrous alkali metal arylate solutions and separation of the arylates from alkali metal sulfite. 3,974,084, Cl. 252-182.000.

Pilkington Brothers Limited: *See—*
Coen, Ernesto; Parry, Joseph; and Steere, Robin Charles, 3,973,942.

Pine, Lloyd A.: *See—*
Segura, Marnell A.; Aldridge, Clyde L.; Riley, Kenneth L.; and Pine, Lloyd A., 3,974,096.

Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., to Rowe International Inc. Switch assembly module with insertable actuators and switches. 3,974,352, Cl. 200-293.000.

Pitowski, Hans Jurgen: *See—*
Gerlach, Klaus; Pitowski, Hans Jurgen; and Schneider, Klaus, 3,974,320.

Pittman, J. P.: *See—*
Gatlin, John M.; and Pittman, J. P., 3,973,635.

Plastona (John Waddington) Limited: *See—*
Brocklehurst, Jack, 3,973,693.

Plessey Handel und Investments A.G.: *See—*
Trueman, Roy; Warsop, Colin; Godfrey, Graham; and Prestidge, John Malcolm, 3,974,341.

Plonka, James H.; and Pews, R. Garth, to Dow Chemical Company, The. Process for production of cyclopropylcyanide. 3,974,199, Cl. 260-464.000.

Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes: *See—*
LaPorte, Robert Josse; and des Reyssiers, Pierre Maurice Malachard, 3,973,363.

Pohjola, Jorma Toivo Tapani. Structure for laterally bracing an endless track of a vehicle. 3,973,638, Cl. 180-9.460.

Poisson, Bernard; and Steydle, Guy, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Pneumatic control device for terminating the machining operation of a spindle machine. 3,973,858, Cl. 408-11.000.

Poitevin, Jean-Pierre; and Dezael, Claude, to Institut Francaise du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Process for purifying a sulfur dioxide containing gas. 3,974,258, Cl. 423-242.000.

Polaroid Corporation: *See—*
Ivester, Andrew S., 3,974,510.

Polli, Gerald P.; and Shoop, Clyde E., to Merck & Co., Inc. Palatable cholestyramine coacervate compositions. 3,974,272, Cl. 424-78.000.

Poltorak, Henry. Bicycle storage locker. 3,973,812, Cl. 312-100.000.

Polymer Corporation Limited: *See—*
Bowers, Brian, 3,974,023.

Polysius AG: *See—*
Klein, Hans; Ritzmann, Horst; and Kremerskothen, Peter, 3,973,757.

Pontius, Rex B.: *See—*
Nierenberg, William A.; and Pontius, Rex B., 3,973,928.

Poolman, Petrus Jacobus; Abdalla, Nabil Ahmed; and Harrewijne, Arend, to U.S. Philips Corporation. Measuring cell for determining oxygen concentrations in a gas mixture. 3,974,054, Cl. 204-195.00S.

Popov, Igor Vasilievich; Bochkarev, Gely Romanovich; Lebedev, Vitaly Fedorovich; and Baryshnikov, Feaor Anisimovich. Process for purifying tap water. 3,974,070, Cl. 210-47.000.

Port, David J.: *See—*
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 3,973,948.

Porta, Frank L.; and Porta, Frank T., to HPS Company, Inc. Safety coupling device. 3,973,791, Cl. 285-305.000.

Porta, Frank T.: *See—*
Porta, Frank L.; and Porta, Frank T., 3,973,791.

Portable Pool Covers, Inc.: *See—*
Martinez, Rudolph J., 3,973,646.

Porter, Carter E.; Parsons, Richmond S.; and Rossiter, Paul H., to Exxon Research and Engineering Company. Adjustable die face pelletizer. 3,973,890, Cl. 425-144.000.

Porter, Patrick C., to Trans Canada Pipelines Limited. Accelerometer pig. 3,973,441, Cl. 73-432.00R.

Porth, Frank L.; Black, James A.; and Farwell, Harry Russell, to Black, James A. Flood coater and squeegee with viscosity sensing and control. 3,973,491, Cl. 101-124.000.

Postlethwaite, Carl A., to Posty Cards, Incorporated. Shipping and storage package for paper sheet items. 3,973,674, Cl. 206-215.000.

Postolov, Petr Moiseevich: *See—*
Akopov, Ernest Mikhailovich; and Postolov, Petr Moiseevich, 3,973,709.

Posty Cards, Incorporated: *See—*
Postlethwaite, Carl A., 3,973,674.

Potekhina, Lidia Alexandrouna: *See—*
Razgulov, Mikhail Mikhailovich; Potekhina, Lidia Alexandrouna; and Mashinistov, Boris Fedorovich, 3,973,570.

Pouey, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). Focalization process of spherical concave diffraction gratings. 3,973,850, Cl. 356-100.000.

Powell, Bruce E.; and Stangeland, Bruce E., to Chevron Research Company. Early detection and warning method for controlling temperature excursions in hydro-processing hydrocarbons. 3,974,065, Cl. 208-213.000.

Powers, Billy G.: *See—*
Smith, Robert L., 3,973,369.

Pozzetti, Mario, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Method and relative apparatus for controlling the cutting capacity of the grinding wheel of a grinder. 3,973,433, Cl. 73-104.000.

PPG Industries, Inc.: *See—*
Edge, Charles K.; and Kunkle, Gerald E., 3,973,940.
Jensen, Thomas H., 3,973,717.
Orcutt, Dee R.; and Collier, Kenneth C., 3,974,359.
Seymour, Samuel L., 3,973,943.

Prasad, Parmanand: *See—*
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, 3,974,330.

Pratt, George W., Jr., to Massachusetts Institute of Technology. Spark plug employing both corona discharge and arc discharge and a system employing the same. 3,974,412, Cl. 313-131.00R.

Pratt, John W., Jr.; and Filsinger, David E., to NCR Corporation. Stuffed ribbon cartridge. 3,973,707, Cl. 226-118.000.

Prell, Hedwig: *See—*
Wortmann, Joachim; Dany, Franz-Josef; Prell, Hedwig; and Kandler, Joachim, 3,974,260.

Prestidge, John Malcolm: *See—*
Trueman, Roy; Warsop, Colin; Godfrey, Graham; and Prestidge, John Malcolm, 3,974,341.

Price-Pearson Refractories Limited: *See—*
Gavin, Derek Gabriel, 3,974,098.

Price, Raymond C. Apparatus to demonstrate air flow through permeable sheet material. 3,973,335, Cl. 35-49.000.

Prichard, Richard J., to Singer Company, The. Tufting machines. 3,973,505, Cl. 112-79.00R.

Prins, Hendrik: *See—*
Breteler, Hendrik Gehardus Franciscus; and Prins, Hendrik, 3,973,809.

Process and Pollution Controls Company: *See—*
Cirulis, Uldis; and Zacharias, Ellis M., Jr., 3,973,430.

Procter & Gamble Company, The: *See—*
Ayers, Peter G., 3,974,025.
Johnson, Charles Louis; and Stuard, Charles Donald, 3,973,719.
Wiersema, Ype; and Rieke, Ross Dale, 3,974,076.

Profit, Christian, to Saft-Societe des Accumulateurs Fixes et de Traction. Nut system for limiting tightening. 3,973,611, Cl. 151-19.00A.

Prokhorov, Viktor Pavlovich: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.

Pronton-Werk Alfred Gauthier GmbH: *See—*
Woerner, Hans, 3,973,842.

Proops, William Robert: *See—*
Papa, Anthony Joseph; and Proops, William Robert, 3,974,109.

Pross, Wilhelm, to Compur-Werk Gesellschaft mit beschrankter Haftung & Co. Electronic control device for photographic exposure factors. 3,974,512, Cl. 354-226.000.

Pugin, Andre: *See—*
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, 3,974,149.

Pugliese, Carl F.: *See—*
Griffiths, Donald E.; and Pugliese, Carl F., 3,974,524.

Purath, Bernd: *See—*
Becker, Klaus; Wolsi, Karl-Heinz; and Purath, Bernd, 3,973,785.

Purdey, John Anthony, to English Clays Lovering Pochin & Company Limited. Separation of liquids and solids. 3,974,074, Cl. 210-81.000.

Puskas, Joseph Emil; Shibe, William J., Jr.; and Wood, William, to Sybron Corporation. Aziridine monomers and copolymers. 3,974,131, Cl. 526-263.000.

Putman, Thomas H.; and Thompson, Francis T., to Westinghouse Corporation. Disc-type automatic expansion valve for refrigerant. 3,973,410, Cl. 62-527.000.

Pylant, John D., to Hycom Incorporated. Printer. 3,973,486, Cl. 101-93.190.

Quaker City Gear Works, Inc.: *See—*
Berlinger, Bernard E., Jr., 3,973,449.

Quaker Oats Company, The: *See—*
Burkwall, Morris P., Jr., 3,974,296.
Gralak, Bruce G., 3,974,295.

Quantel Limited: *See—*
Stalley, Anthony Donald; and Young, Michael Anthony Richard, 3,973,817.

Quisenberry, Robert E., to Texaco Inc. Isomerization of C_5 and C_6 isomerizable hydrocarbons. 3,974,061, Cl. 208-65.000.

R. G. LeTourneau, Inc.: *See—*
Friend, Aaron D.; and Lindahl, Hilmer C., 3,974,429.

Raasch, Hans: *See—*
Engelhardt, Dietmar; and Raasch, Hans, 3,973,742.

Rabinovitch, Maurice; and Bibring, Herve, to Office National d'Etudes et de Recherches Aerospatialcs (O.N.E.R.A.). Casting mold for directional solidification of an alloy. 3,973,750, Cl. 249-114.000.

Raffaele, Italo; and Rossi, Luigi, to Instrumentation Laboratory, Inc. Blood equilibrator. 3,973,915, Cl. 23-259.000.

Rainer, Georg, to Byk-Gulden Lomberg Chemische Fabrik GmbH. Halogen pyrazoles derivatives, a method for producing these halogen pyrazole derivatives and medicaments containing them. 3,974,176, Cl. 260-310.00R.

Ramm, Claus, to Siemens Aktiengesellschaft. Liquid ring compressor. 3,973,879, Cl. 417-69.000.

Ramp, Floyd Lester, to B. F. Goodrich Company, The. Electrolytic cation exchange process for conjoint manufacture of chlorine and phosphate salts. 3,974,047, Cl. 204-90.000.

Randolph, James B.: *See—*
Nelson, Jerome W.; and Randolph, James B., 3,974,356.

Rapkin, Myron Colman: *See—*
Van der Werf, Loren John; and Rapkin, Myron Colman, 3,973,909.

Rauhut, Michael McKay; and Semsel, Andrew Milo, to American Cyanamid Company. Stabilization of hydrogen peroxide solutions. 3,974,086, Cl. 252-188.3CL.

Rauhut, Michael McKay, to American Cyanamid Company. Chemiluminescent device having longer shelf life. 3,974,368, Cl. 240-2.250.

Rauser, Jerry L.: *See—*
Fett, Darrell L.; Bird, David A.; and Rauser, Jerry L., 3,974,402.

Raymond Lee Organization, Inc., The: *See—*
Dean, Melvin, 3,973,741.

Raynes, Edward Peter: *See—*
Gray, George William; Harrison, Kenneth John; Hulme, David Sanderson; and Raynes, Edward Peter, 3,974,087.

Raytheon Company: *See—*
Fassett, Matthew, 3,974,462.
Georgopoulos, Christos J., 3,974,403.

Razgulov, Mikhail Mikhailovich; Potekhina, Lidia Alexandrouna; and Mashinistov, Boris Fedorovich. Surgical clip formed from a suture material for end-to-end suturing of hollow organs on a mandrel. 3,973,570, Cl. 128-337.000.

Razzano, John S.; and Simpson, Verne G., to General Electric Company. Fluorosilicone copolymers and process for the preparation thereof. 3,974,120, Cl. 260-30.4SB.

RCA Corporation: *See—*
Alves, Joseph Ferrierea, III, 3,974,438.
Faulkner, Richard Dale; and Tomasetti, Charles Michael, 3,974,411.
Ipri, Alfred Charles; Scott, Joseph Hurlong; and Sarace, John Carl, 3,974,515.
Kressel, Henry; Ettenberg, Michael; and Ladany, Ivan, 3,974,514.
Redfield, David, 3,973,994.
Ritzie, Andrew David, 3,974,501.

Rechmeier, Helmuth Y.: *See—*
Rohrbach, Rudolf; Rohrbach, Gerhard; and Rechmeier, Helmuth Y., 3,973,980.

Redfield, David, to RCA Corporation. Solar cell with grooved surface. 3,973,994, Cl. 136-89.000.

Redifon Limited: *See—*
Lobb, Daniel Richard, 3,973,826.

Reding, John Thomas; and Riley, Robert Lee, Jr., to Dow Chemical Company, The. Aluminum alloy anode composition. 3,974,055, Cl. 204-197.000.

Reed, Robert D.; and Zink, John S., to John Zink Company. Apparatus for using exhaust steam for smoke suppression in flares. 3,973,899, Cl. 431-202.000.

Reed, Terry J.; and Smith, Jack R., to Westinghouse Electric Corporation. Control apparatus for modulating the inlet guide vanes of a gas turbine employed in a combined cycle electric power generating plant as a function of load or inlet blade path temperature. 3,973,391, Cl. 60-39.290.

Rees, Herbert, to Husky Injection Molding Systems. Injection-molding machine with transverse feed. 3,973,892, Cl. 425-250.000.

Rees, James George Arthur, to C. L. Instruments Limited. Recording device with plural recording discs with one deflected for improved viewing. 3,974,505, Cl. 346-44.000.

Regency Electronics, Inc.: *See—*
Cunningham, Charles, 3,974,452.
Cunningham, Charles, Jr., 3,974,450.

Regie Nationale des Usines Renault: *See—*
Poisson, Bernard; and Steydle, Guy, 3,973,858.
Toulc'hoat, Alain; and Papot, Michel, 3,973,432.

Reich, Walter; and Schaffner, Kurt, to Elteba AG; and Perforag Ltd. Device for punching program strips. 3,973,458, Cl. 83-414.000.

Reighard, Alan B.: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 3,973,697.

Reilly, Joseph R.: *See—*
Berggren, L. John; and Reilly, Joseph R., 3,973,897.

Reiman, Reuben H. Children's corrective foot splint. 3,973,559, Cl. 128-80.00A.

Remy, David C., to Merck & Co., Inc. 10,11-Furo-derivatives of cyproheptadine. 3,974,285, Cl. 424-267.000.

Rengo Co., Ltd.: *See—*
Mori, Yasuharu, 3,974,490.

Republic Packaging Corporation: *See—*
Schmid, Donald E., 3,973,720.

Research Corporation: *See—*
Maley, Frank, 3,974,269.
Subramanian, Gopal; and McAfee, John Gilmore, 3,974,268.

Rettinghaus, Gerhard; and Fluckiger, Rudolf, to Balzers Patent-und Betciligungs AG. Mass spectrometer. 3,974,380, Cl. 250-288.000.

Rex Chainbelt Inc.: *See—*
Butzow, Neil W.; and Harris, Bernard, 3,974,009.

Reynolds, David: *See—*
Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, 3,973,367.

Reynolds, Desmond Henry James; and Yardley, Alfred, to Girling Limited. Power-operated boosters for vehicle braking systems. 3,973,401, Cl. 60-548.000.

Reynolds, James E.: *See—*
Goens, Duane N.; and Reynolds, James E., 3,973,949.

Reynolds Metals Company: *See—*
Ward, Bennie R.; and Geisler, Donald R., 3,973,921.

Rhone-Progil: *See—*
Berthoux, Jean; and Martinaud, Jacques-Pierre, 3,974,227.

Rhudy, John S.: *See—*
Knight, Bruce L.; Rhudy, John S.; and Gogarty, William B., 3,973,629.

Ribka, Joachim: *See—*
Hunger, Klaus; Ribka, Joachim; and Rieper, Wolfgang, 3,974,136.

Rice, George A.: *See—*
Girard, Roland T.; Rice, George A.; and DeTommasi, Arthur N., 3,974,304.

Richardson-Merrell Inc.: *See—*
Fleming, Robert W.; Sill, Arthur D.; and Sweet, Francis W., 3,974,186.

Richerson, David W., to Norton Company. Ceramic electrical resistance igniter. 3,974,106, Cl. 252-516.000.

Richman, Seymour I., to Rochester Button Company. Decorative rod making equipment. 3,973,889, Cl. 425-130.000.

Richtzenhain, Hermann: *See—*
El-Chahawi, Moustafa; and Richtzenhain, Hermann, 3,974,202.

Ricoh Co., Ltd.: *See—*
Hashimoto, Mitsuru, 3,974,167.

Rieke, Ross Dale: *See—*
Wiersema, Ype; and Rieke, Ross Dale, 3,974,076.

Rieper, Wolfgang: *See—*
Hunger, Klaus; Ribka, Joachim; and Rieper, Wolfgang, 3,974,136.

Rieter Machine Works, Ltd.: *See—*
Wurmli, Arthur, 3,973,647.

Rigaku Denki Company Limited: *See—*
Uchida, Hiroshi, 3,973,636.

Riley, Kenneth L.: *See—*
Segura, Marnell A.; Aldridge, Clyde L.; Riley, Kenneth L.; and Pine, Lloyd A., 3,974,096.

Riley, Robert Lee, Jr.: *See—*
Reding, John Thomas; and Riley, Robert Lee, Jr., 3,974,055.

Rinehimer, Elwood; Walters, Donald M.; and Jarrett, Kenneth L., Sr., to Eagle Shirtmakers, Inc. Method and apparatus for making shirt cuffs. 3,973,506, Cl. 112-130.000.

Ringleben, Hans: *See—*
Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringleben, Hans; and Knabel, Walter, 3,974,011.

Ritsko, Joseph E.: *See—*
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 3,973,948.

Ritzie, Andrew David, to RCA Corporation. Dual-mode adaptive parameter processor for continuous wave radar ranging systems. 3,974,501, Cl. 343-14.000.

Ritzmann, Horst: *See—*
Klein, Hans; Ritzmann, Horst; and Kremerskothen, Peter, 3,973,757.

Rivers, Charles F. Plural contacting elevators with inclined platforms. 3,973,686, Cl. 214-95.00R.

Rivola, Luigi; and Notari, Bruno, to Snam Progetti S.p.A. Process for recovering ammonium organic salts from aqueous solutions. 3,974,216, Cl. 260-541.000.

Robert Bosch G.m.b.H.: *See—*
Engfer, Ortwin; and Korkowski, Eberhard, 3,973,804.
Jakob, Gert; and Gansert, Willi, 3,973,477.
Schneider, Hans-Dieter, 3,974,521.
Siebke, Hans; Moro, Brigitte; Schonborn, Manfred; and Jahnke, Horst, 3,974,040.
Wessel, Wolf; Schwammle, Rudolf; Schnurle, Hans; and Knapp, Heinrich, 3,973,529.

Roberts, Alfred M., to Campbell Chain Company. Sound deadened chain. 3,973,389, Cl. 59-35.00R.

Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, to Thomas J. Lipton, Inc. Ice confection. 3,974,300, Cl. 426-565.000.

Robertshaw Controls Company: *See—*
Caldwell, Edward N., 3,973,619.
Sliger, Boyd P., 3,973,729.
Tyler, Hugh J.; and Newell, Dennis E., 3,974,430.

Robertson, J. Hibbard: *See—*
Souza, Anthony J.; and Robertson, J. Hibbard, 3,973,352.

Rochester Button Company: *See—*
Richman, Seymour I., 3,973,889.

Rochlitz, Jurgen; and Wiedemann, Wolfgang, to Hoechst Aktiengesellschaft. Electrophotographic recording material and process for its manufacture. 3,973,959, Cl. 96-1.500.

Rockwell International Corporation: *See—*
Ervin, Guy, Jr., 3,973,552.
Johnson, Lee A., 3,974,365.

Rodi, Fritz: *See—*
Woditsch, Peter; Hill, Kurt; Hund, Franz; and Rodi, Fritz, 3,974,079.

Rodriguez, Valentin. Method of obtaining high temperature resistant assemblies comprising isolated silicon islands bonded to a substrate. 3,974,006, Cl. 156-3.000.

Roe, Norman P., to Consolidated Products Corporation. Electromechanical cable. 3,973,385, Cl. 57-144.000.

Rogers, Lloyd W., Jr., to General Motors Corporation. Belt retractor with winding prevention mechanism. 3,973,786, Cl. 280-747.000.

Rohrbach, Gerhard: *See—*
Rohrbach, Rudolf; Rohrbach, Gerhard; and Rechmeier, Helmuth Y., 3,973,980.

Rohrbach, Rudolf; Rohrbach, Gerhard; and Rechmeier, Helmuth Y., to Rohrbach, Rudolf. Process for the heat treatment of material in dust form. 3,973,980, Cl. 106-100.000.

Rohrle, Manfred; and Hummel, Hagen, to Mahle GmbH. Method of electron beam welding with X-ray detection. 3,974,381, Cl. 250-310.000.

Rollei-Werke Franke & Heidecke: *See—*
Waaske, Heinz, 3,974,513.

Rolls-Royce (1971) Limited: *See—*
Bird, Jack Raymond, 3,973,875.

Roos, Erling, to Granges Essen Aktiebolag. Method for insulating tubing. 3,974,013, Cl. 156-165.000.

Rosa, Edmund: *See—*
Penn, Franklin E.; Fletcher, Walter B.; Rosa, Edmund; and Perina, Joseph, 3,973,834.

Rosar, Edward C.; Hobaugh, John R.; and Lepetic, Vuko M., to Industrial Resources, Inc. Froth flotation process. 3,973,734, Cl. 241-20.000.

Rosch, Gunter: *See—*
Sahm, Wilfried; Schinzel, Erich; and Rosch, Gunter, 3,974,172.

Rosdolsky, Hans G.; and Meyr, Heinrich, to Hasler AG. Facsimile communication system. 3,974,326, Cl. 178-6.000.

Rosinski, Edward J.: *See—*
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,062.
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,063.

Rosow, Carl. Animal holder frame means. 3,973,522, Cl. 119-103.000.

Rossi, Luigi: *See—*
Raffaele, Italo; and Rossi, Luigi, 3,973,915.

Rossiter, Paul H.: *See—*
Porter, Carter E.; Parsons, Richmond S.; and Rossiter, Paul H., 3,973,890.

Roth, Kurt: *See—*
Zimmermann, Hans; Thumm, Heinrich; and Roth, Kurt, 3,973,902.

Rounds, Hugh G.: *See—*
Schoenrock, Karlheinz W. R.; and Rounds, Hugh G., 3,973,986.

Roussel-UCLAF: *See—*
Warnant, Julien; and Jolly, Jean, 3,974,182.

Rowe, Archie C., to Vuestamp International Proprietary Limited. Hand stamp. 3,973,495, Cl. 101-405.000.

Rowe International Inc.: *See—*
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 3,974,352.

Roy, Donald W.; and Stermole, Franklin J., to Coors Porcelain Company. Method for manufacturing a transparent ceramic body. 3,974,249, Cl. 264-65.000.

Royal Industries, Inc.: *See—*
Stevenson, Billy E.; and Rumsey, Thomas R., 3,973,805.

Rubin, David. Fuel conversion system. 3,973,524, Cl. 123-3.000.

Rubinshtein, Georgy Nesanelovich: *See—*
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Rucker Company, The: *See—*
Balston, John C., 3,973,511.

Ruepp, Ferdinand: *See—*
Spencer, John; Ruepp, Ferdinand; and Whewell, Robert, 3,973,359.

Rule, Norman G.: *See—*
Contois, Lawrence E.; Rule, Norman G.; and Staudenmayer, William J., 3,973,962.

Rumsey, Thomas R.: *See—*
Stevenson, Billy E.; and Rumsey, Thomas R., 3,973,805.

Russell, Ronald W.; and Black, Kyle M., to National Semiconductor Corporation. Amplifier output stage. 3,974,456, Cl. 330-35.000.

Russell, Wayne B., Jr. Multi-stage extendible and contractible shaft with shock absorption. 3,973,468, Cl. 91-25.000.

Russell, Wayne B., Jr. Throttle control mechanism for an engine. 3,973,472, Cl. 92-13.600.

Rust, Ambrose G. Friction welding. 3,973,715, Cl. 228-112.000.

Rutkowski, Alfred J.; and Szykowski, John P., to Exxon Research and Engineering Company. Biodegradable seal swell additive with low toxicity properties for automatic transmission fluids, power transmission fluids and rotary engine oil applications. 3,974,081, Cl. 252-79.000.

S & C Electric Company: *See—*
Killough, Joseph R., Jr., 3,974,397.

Safft, Klaus: *See—*
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, 3,973,779.

Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Profit, Christian, 3,973,611.

Sahm, Wilfried; Schinzel, Erich; and Rosch, Gunter, to Hoechst Aktiengesellschaft. Benzofuran derivatives. 3,974,172, Cl. 260-307.00D.

Saigh, Philip A.; Glueckert, Albert J.; Budininkas, Pranas; and Caldwell, Joseph, Jr., to General American Transportation Corporation. Toilet system. 3,974,075, Cl. 210-86.000.

Saiia, Anthony J.: *See—*
Ecker, Franklin A.; and Saiia, Anthony J., 3,973,379.

Saito, Nagao; Kobayashi, Kazuhiko; and Oizumi, Toshiro, to Mitsubishi Denki Kabushiki Kaisha. Process and apparatus for electrical discharge shaping using sequential switching. 3,974,357, Cl. 219-69.00M.

Sallberg, David W.; and Meyer, Walter E., to Koehring Company. Structure for and method of error compensation. 3,974,364, Cl. 235-151.310.

Sambus, Joseph P. Work guide apparatus for a sewing machine. 3,973,507, Cl. 112-136.000.

Samways, Bruce; Sanderson, Edward George; and Tamlyn, Arthur John Norman, to British Cellophane Limited. Copolymer coating compositions. 3,974,118, Cl. 260-29.6WQ.

Sanchez, Armando Rodriguez: *See—*
de la Cuadra Herrera, Antonio; Tallante, Miguel Fernandez; and Sanchez, Armando Rodriguez, 3,974,254.

Sanders, Thomas J.; Davis, Jacob A.; and Morcom, William R., to Harris Corporation. Metallic ground grid for integrated circuits. 3,974,517, Cl. 357-48.000.

Sanderson, Edward George: *See—*
Samways, Bruce; Sanderson, Edward George; and Tamlyn, Arthur John Norman, 3,974,118.

Sandoz, Inc.: *See—*
Manning, Robert E., 3,974,283.

Sandvik Aktiebolag: *See—*
Lundgren, Evert Gustav, 3,973,308.

Sankyo Company Limited: *See—*
Kitano, Noritoshi; Kondo, Fusao; Kusano, Kenichi; and Ishibashi, Keijiro, 3,974,291.

Sannella, Joseph L.: *See—*
Cerny, Daryl D.; Cannon, Robert W.; Okeley, Robert E., II; and Sannella, Joseph L., 3,973,496.

Santilli, Arthur A.; Scotese, Anthony C.; and Tomarelli, Rudolph R., to American Home Products Corporation. 4-Pyrimidinylthioacetic acid derivatives. 3,974,162, Cl. 260-256.50R.

Sanyo Electric Co., Ltd.: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.

Sarace, John Carl: *See—*
Ipri, Alfred Charles; Scott, Joseph Hurlong; and Sarace, John Carl, 3,974,515.

Sargent Industries, Inc.: *See—*
Hintzman, Roland D., 3,973,744.

Sarll, Peter Geoffrey, to Mobil Oil Corporation. Heat exchange apparatus. 3,973,623, Cl. 165-94.000.

Sasaki, Tatsuji: *See—*
Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, 3,974,000.

Sasano, Tetsuro: *See—*
Yano, Tsuyoshi; Ichikawa, Kazumasa; Take, Takao; and Sasano, Tetsuro, 3,974,024.

Sassano, Daniel R.; and Edelman, Leonard E., to Westinghouse Electric Corporation. Liquid modified epoxy resins and their preparation. 3,974,113, Cl. 260-18.0EP.

Sato, Akiro: *See—*
Shiba, Keisuke; Hinata, Masanao Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, 3,973,969.

Sato, Hideo: *See—*
Koga, Michio; and Sato, Hideo, 3,974,236.

Sato, Kunio; Ishida, Tomio; and Sugihara, Kanji, to Matsushita Electric Industrial Co., Ltd. Overtemperature and overcurrent resistor fuse. 3,974,105, Cl. 252-512.000.

Sato, Yasuhiko; Komiya, Akitoshi; and Shiobara, Toshio, to Shin-Etsu Chemical Co., Ltd. Heat-curable silicone resin compositions. 3,974,122, Cl. 260-37.0SB.

Satsumabayashi, Kazuyoshi; and Mano, Kiyoshi, to Kabushiki Kaisha Komatsu Seisakusho. High toughness and wear-resistance steel. 3,973,951, Cl. 75-126.00Q.

Saunders, Howard E.: *See—*
Croop, Edward J.; Saunders, Howard E.; and Westervelt, Dean C., 3,974,302.

Savidge, David Harvey; and Wadsworth, Eric, to British Steel Corporation. Surface defect probe and dual channel apparatus with liftoff compensation. 3,974,442, Cl. 324-37.000.

Sawa, Tsutomu: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,973,608.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,974,184.

Scalzo, Joseph E.; and Tulowitzki, John. Thermostatically controlled safety device for oil burners. 3,973,727, Cl. 236-11.000.

Scandia Packaging Machinery Company: *See—*
Anderson, Andrew W.; and Mullin, John P., 3,973,374.

Schaaf, Robert: *See—*
Howard, Sol; and Schaaf, Robert, 3,973,936.

Schaaf, Thomas K.: *See—*
Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,974,213.

Schacht, Louis L. Flower caddy. 3,973,356, Cl. 47-41.00R.

Schaeffer, Georg: *See—*
Pietzsch, Siegfried; and Schaeffer, Georg, 3,974,084.

Schaffner, Kurt: *See—*
Reich, Walter; and Schaffner, Kurt, 3,973,458.

Schankler, Martin M., to Microfilm Enterprises Corporation. Film reel spacer. 3,973,740, Cl. 242-68.500.

Schantzen, Wayne G.: *See—*
Janssen, Roger G.; and Schantzen, Wayne G., 3,973,808.

Scheiber, Herbert: *See—*
Nilgens, Heinrich; Ostertag, Karl; and Scheiber, Herbert, 3,973,739.

Schenectady Chemicals, Inc.: *See—*
Laganis, Deno, 3,974,115.

Schiemann, Heinz; Herrmann, Albert; and Kleen, Gerhard, to Siemens Aktiengesellschaft. Measuring transformer for a fully insulated, metal-clad high-voltage installation. 3,974,440, Cl. 323-44.00R.

Schindler, Georg: *See—*
Frenken, Hans; Schindler, Georg; and Kramer, Horst, 3,973,310.

Schinzel, Erich: *See—*
Sahm, Wilfried; Schinzel, Erich; and Rosch, Gunter, 3,974,172.

Schloemann-Siemag Aktiengesellschaft: *See—*
Schmoll, Heinz, 3,973,595.

Schmid, Donald E., to Republic Packaging Corporation. Protective cushioning pad. 3,973,720, Cl. 229-14.00C.

Schmidt, Edward C.; and Uroshevich, Miroslav. Bellows pump with extension having integral valves. 3,973,700, Cl. 222-153.000.

Schmidt, Hans Heinrich, to Enor Nominees Pty. Limited. Apparatus for progressively constructing a wall of cementitious material. 3,973,885, Cl. 425-65.000.

Schmidt, Helmut: *See*—
Muhling, Alois; and Schmidt, Helmut, 3,973,443.
Schmidt, Wolfhard: *See*—
Hurm, Karl; and Schmidt, Wolfhard, 3,974,130.
Schmoll, Heinz, to Schloemann-Siemag Aktiengesellschaft. Arrangement for actuating mechanically independent valves in a pressure fluid system. 3,973,595, Cl. 137-637.100.
Schneider, Barry L., to Chemtrust Industries Corporation. Sealing closure cap assembly. 3,973,690, Cl. 215-329.000.
Schneider, Gerhart: *See*—
Erdmann, Dietrich; Schneider, Gerhart; and Koch, Wolfgang, 3,973,944.
Schneider, Hans-Dieter, to Robert Bosch G.m.b.H. Circuit for automatic gamma balancing. 3,974,521, Cl. 358-32.000.
Schneider, Klaus: *See*—
Gerlach, Klaus; Pitowski, Hans Jurgen; and Schneider, Klaus, 3,974,320.
Schneider, William P., to Upjohn Company, The. Racemic prostaglandins of the 2-series and analogs thereof. 3,974,200, Cl. 260-468.00D.
Schnurle, Hans: *See*—
Wessel, Wolf; Schwammle, Rudolf; Schnurle, Hans; and Knapp, Heinrich, 3,973,529.
Schoenleben, Willibald: *See*—
Decker, Martin; Schoenleben, Willibald; Toussaint, Herbert; and Hoffmann, Hewig, 3,974,159.
Schoenrock, Karlheinz W. R.; and Rounds, Hugh G., to Amalgamated Sugar Company, The. Process for the purification of sugarbeet juice and increasing the extraction of sugar therefrom. 3,973,986, Cl. 127-46.00A.
Schommer, John. Electric worm collecting apparatus. 3,973,354, Cl. 47-1.300.
Schonball, Walter. Electric generator arrangement. 3,974,396, Cl. 290-54.000.
Schonborn, Manfred: *See*—
Siebke, Hans; Moro, Brigitte; Schonborn, Manfred; and Jahnke, Horst, 3,974,040.
Schranz, Karl-Wilhelm: *See*—
Meier, Ernst; Glockner, Hans; Kuffner, Karl; Boie, Immo; and Schranz, Karl-Wilhelm, 3,973,979.
Schreiber, Richard Henry; and Keil, John Gerard, to Bristol-Myers Company. Process for the preparation of 1-[L-(−)-γ-amino-α-hydroxybutyryl]-kanamycin A (RD-1341A). 3,974,137, Cl. 536-10.000.
Schreier, Wilford R., to Hammond Corporation. Delayed vibrato and burble circuit. 3,973,463, Cl. 84-1.250.
Schrock, Wilfried; Metzger, Karl-Georg; and Konig, Hans-Bodo, to Bayer Aktiengesellschaft. Penicillins. 3,974,288, Cl. 424-271.000.
Schrock, Wilfried: *See*—
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 3,974,140.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,141.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,974,142.
Schroter, Herbert, to Ciba-Geigy Corporation. 1,1a,6,10b-Tetrahydro-1,6-methano-dibenzo[a,e]cyclopropa[c]cycloheptenes as antidepressants. 3,974,284, Cl. 424-267.000.
Schudel, Peter: *See*—
Bertele, Erhard; and Schudel, Peter, 3,974,226.
Lamparsky, Dietmar; and Schudel, Peter, 3,974,222.
Schultze, Edward F.: *See*—
Hardy, William C.; Schultze, Edward F.; and Shepard, John C., 3,973,627.
Schuman, Mark. Illusion amusement device. 3,973,771, Cl. 272-8.00R.
Schussler, Hans; and Kohlbacher, Gerhard, to Licentia Patent-Verwaltungs-G.m.b.H. Piezoelectric resonators. 3,974,405, Cl. 310-9.800.
Schwammle, Rudolf: *See*—
Wessel, Wolf; Schwammle, Rudolf; Schnurle, Hans; and Knapp, Heinrich, 3,973,529.
Schwan, Thomas J., to Morton-Norwich Products, Inc. α-[2-(2-Pyridyl)ethylamino]phenylacetic acid dihydrochloride Hemihydrate. 3,974,169, Cl. 260-295.00R.
Schwartz, Werner, to Wacker, Werner. Method serving the stunning of animals for slaughter. 3,973,290, Cl. 17-45.000.
Schweiker, George C.; and Jepson, John W., to Acushnet Company. Solid rubber golf ball. 3,974,238, Cl. 260-879.000.
Schweitzer, Edmund O., Jr. Polyphase fault current flow detecting and resetting means. 3,974,446, Cl. 324-133.000.
Schwemmer, Ronald; and Crozier, William, to Lawrence Peska Associates, Inc., a part interest. Spike heel plate. 3,973,338, Cl. 36-65.000.
Schwenke, Dieter, to Hauni-Werke Korber & Co., KG. Apparatus for changing the orientation of filter cigarettes or the like. 3,973,671, Cl. 198-248.000.
Schwerdtel, Wulf: *See*—
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 3,974,224.
Schwille, Dieter; Seiz, Hermann; Sorg, Ewald; and Sommer, Udo, to AGFA-Gevaert, A.G. Process for the production of protein-containing food additives. 3,974,294, Cl. 426-32.000.
SCM Corporation: *See*—
Dorschner, Kenneth P.; and Johnson, Robert P., 3,974,292.
Kaiser, Gregory L., 3,974,102.
Kaiser, Gregory L., 3,974,103.
Scotese, Anthony C.: *See*—
Santilli, Arthur A.; Scotese, Anthony C.; and Tomarelli, Rudolph R., 3,974,162.
Scotoni, Ralph, to Hilti Aktiengesellschaft. Setting tool containing a laval nozzle. 3,973,708, Cl. 227-10.000.
Scott, Forrest C. Starter safety device. 3,973,546, Cl. 123-179.00A.
Scott, Joseph Hurlong: *See*—
Ipri, Alfred Charles; Scott, Joseph Hurlong; and Sarace, John Carl, 3,974,515.
Scott nee Reid, Jennifer Joan: *See*—
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 3,974,300.
Scott Paper Company: *See*—
Kolbach, Charles G., 3,973,291.
Scott, William J.; and Lucas, James F., to Ideal Industries, Inc. Connector. 3,973,821, Cl. 339-266.00R.
Sczepaniak, Werner; and Materne, Werner, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Making a stabilized superconductor. 3,974,043, Cl. 204-29.000.
Seaboard Oil & Gas Co.: *See*—
Wheeler, Virgil C.; and Sharrett, Harry D., 3,973,630.
Seaman Corporation: *See*—
Seaman, Norman R., 3,973,364.
Seaman, Norman R., to Seaman Corporation. Reinforced sealed joint for membrane segments. 3,973,364, Cl. 52-57.000.
Searcy, William W.: *See*—
Struger, Odo J.; and Searcy, William W., 3,974,484.
Segal, Fred. Pilot drill locating means for hole saw assembly. 3,973,862, Cl. 408-204.000.
Segura, Marnell A.; Aldridge, Clyde L.; Riley, Kenneth L.; and Pine, Lloyd A., to Exxon Research and Engineering Company. Water gas shift catalyst. 3,974,096, Cl. 252-439.000.
Seidel, Hans H. Internal combustion engine. 3,973,530, Cl. 123-32.0SP.
Seider, Seymour. Automatic combustion control with improved electrical circuit. 3,973,898, Cl. 431-76.000.
Seiler, Herbert; and Dussy, Paul, to Ciba-Geigy AG. Water-insoluble reactive dyestuffs which are soluble in aprotic solvents. 3,974,160, Cl. 260-249.000.
Seiwert, Paul J., to MacLeod Company, The. Scrap washing system. 3,973,573, Cl. 134-63.000.
Seiz, Hermann: *See*—
Schwille, Dieter; Seiz, Hermann; Sorg, Ewald; and Sommer, Udo, 3,974,294.
Seki, Norio: *See*—
Watanabe, Teruji; Ishihara, Hideo; and Seki, Norio, 3,974,487.
Sekikawa, Kazue: *See*—
Onodera, Toshihiro; and Sekikawa, Kazue, 3,974,463.
Sekisui Jushi Kabushiki Kaisha: *See*—
Nakane, Jun, 3,973,721.
Seleznev, Konstantin Pavlovich; Galerkin, Jury Borisovich; Strizhak, Leonid Yakovlevich; and Zuev, Anatoly Vasilievich. Centrifugal compressor. 3,973,872, Cl. 415-211.000.
Semmerling, Ralph P., to United States Gypsum Company. Clip for attaching header to I-beam. 3,973,302, Cl. 24-243.0AB.
Semperit Aktiengesellschaft: *See*—
Friedl, Franz; Kohler, Erich; Holler, Hans; and Gebauer, Franz, 3,973,749.
Semple, James Campbell; and Murray, Gordon Arthur William. Attaching fibrous connective tissue to bone. 3,973,277, Cl. 3-1.000.
Semsel, Andrew Milo: *See*—
Rauhut, Michael McKay; and Semsel, Andrew Milo, 3,974,086.
Senger, Egon. Cleaning machine for metal parts. 3,973,989, Cl. 134-141.000.
Serdex-Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation: *See*—
LeRoche Navarron, Marguerite Severine Lucie, 3,974,164.
Sergeev, Vladimir Alexandrovic: *See*—
Volpin, Mark Afimovic; Hetflejs, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.
Service d'Exploitation Industrielle des Tabacs et des Allumettes: *See*—
Ginhoux, Louis; and Flesselles, Jacques, 3,973,431.
Seward, Gerald J.; and Walters, Robert P. Valve-controlled braking system for vehicles. 3,973,803, Cl. 303-89.000.
Seymour, Samuel L., to PPG Industries, Inc. Apparatus for supporting shaped glass sheets for tempering. 3,973,943, Cl. 65-348.000.
Shank, Wayne C., to Avco Corporation. Negative torque sensor for a gas turbine engine. 3,973,873, Cl. 416-43.000.
Shannon, Richard E. Detachable feed mechanism for printing devices and the like. 3,973,768, Cl. 271-99.000.
Sharov, Petr Mikhailovich: *See*—
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.
Sharp, James H.: *See*—
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 3,973,843.
Sharpless, Edward N., to Ashley-Butler, Inc. Thermometric compositions including inert additives and products. 3,974,317, Cl. 428-215.000.
Sharrett, Harry D.: *See*—
Wheeler, Virgil C.; and Sharrett, Harry D., 3,973,630.

Shealy, Noah Alvin, to Clark Equipment Company. Dynamic tooth clutch. 3,973,450, Cl. 74-710.500.
Sheldahl, Inc.: *See*—
Tameo, Gerald N., 3,973,453.
Shell Oil Company: *See*—
Cowles, Christopher S., 3,974,476.
De La Mare, Harold E., 3,974,129.
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., 3,974,091.
Shell, Timothy F. Removable hand grip for fishing rod handle. 3,973,348, Cl. 43-23.000.
Shelton, Everett E. Emissions control system for an automotive vehicle or the like. 3,973,916, Cl. 23-277.00C.
Shepard, John C.: *See*—
Hardy, William C.; Schultze, Edward F.; and Shepard, John C., 3,973,627.
Sheridan, David S.; and Jackson, Isaac S., to National Catheter Corporation. Tracheostomy tube device with neck size adjustment means. 3,973,569, Cl. 128-351.000.
Sherman & Reilly, Inc.: *See*—
Chadwick, William H., Jr., 3,973,754.
Shersher, Yakov Isaevich. Artificial hip-joint. 3,973,278, Cl. 3-1.912.
Shetty, Bola Vithal; and Thomas, Telfer Lawson, to Pennwalt Corporation. 1-(Amino-alkyl)-2-aryl-cyclohexane alcohols and esters. 3,974,157, Cl. 260-247.20B.
Shiba, Keisuke; Hinata, Masanao; Kato, Hirotetu; Sato, Akiro; and Ogawa, Akira, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion. 3,973,969, Cl. 96-124.000.
Shibe, William J., Jr.: *See*—
Puskas, Joseph Emil; Shibe, William J., Jr.; and Wood, William, 3,974,131.
Shields, John: *See*—
Dunn, Lyman D.; and Shields, John, 3,974,071.
Shiffler, Richard Welty: *See*—
Coffman, Robert Lee; and Shiffler, Richard Welty, 3,974,080.
Shigemori, Youjiro; and Mitumori, Yoshio, to Star Seimitsu Kabushiki Kaisha. Contactless buzzer. 3,974,499, Cl. 340-392.000.
Shimano Industrial Company, Limited: *See*—
Kine, Masayoshi, 3,973,451.
Nagano, Masashi, 3,973,447.
Shimizu, Kazuaki; and Toshida, Shunichi, to Nissan Motor Co., Ltd. Closed loop type disc brake. 3,973,652, Cl. 188-73.400.
Shimoishizaka, Masashi: *See*—
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, 3,974,467.
Shimosawa, Akemi: *See*—
Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, 3,974,041.
Shin-Etsu Chemical Co., Ltd.: *See*—
Sato, Yasuhiko; Komiya, Akitoshi; and Shiobara, Toshio, 3,974,122.
Shinbo, Masafu: *See*—
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, 3,974,188.
Shinoda, Hidenori: *See*—
Watanabe, Sadakazu; Shinoda, Hidenori; and Imasato, Yuichi, 3,973,725.
Shiobara, Toshio: *See*—
Sato, Yasuhiko; Komiya, Akitoshi; and Shiobara, Toshio, 3,974,122.
Shipov, Emanuil Ivanovich: *See*—
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.
Shirao, Syoziro, to Kabushiki Kaisha Komatsu Seisakusho. Mold changing apparatus for a press machine. 3,973,427, Cl. 72-448.000.
Shishido, Yoshio: *See*—
Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, 3,974,332.
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, to Meiji Seika Kaisha, Ltd. Process for preparing a cephamycin type antibiotic substance. 3,974,035, Cl. 195-36.00C.
Shoop, Clyde E.: *See*—
Polli, Gerald P.; and Shoop, Clyde E., 3,974,272.
Shultz, William E. Spring compression tool. 3,973,314, Cl. 29-227.000.
Shum, Peter Nai-Kee, to C.A.V. Limited. Liquid fuel injection pumping apparatus. 3,973,542, Cl. 123-140.00R.
Siebke, Hans; Moro, Brigitte; Schonborn, Manfred; and Jahnke, Horst, to Robert Bosch G.m.b.H. Controls for maintaining low nitrogen oxides content in internal combustion engine exhaust gases. 3,974,040, Cl. 204-1.00T.
Siebold, Howard E., to Liquid Controls Corporation. Flexible band device. 3,973,582, Cl. 137-202.000.
Siemens Aktiengesellschaft: *See*—
Baum, Heinz, 3,974,448.
Bronner, Karlheinz; Grassme, Ulrich; and Soder, Eickhardt, 3,974,387.
Ditler, Walter; Kintopp, Erich; and Linke, Gerhard, 3,974,388.
Grim, Stig, 3,974,385.
Hebenstreit, Ernst, 3,974,366.
Keprda, Jaroslav, 3,974,346.
Knier, Hans Josef, 3,974,498.
Lutz, Karl-Anton; and Knorpp, Eberhard, 3,974,339.
Michel, Eberhard, 3,974,027.
Mugele, Kurt, 3,973,865.
Muhling, Alois; and Schmidt, Helmut, 3,973,443.
Ramm, Claus, 3,973,879.
Schiemann, Heinz; Herrmann, Albert; and Kleen, Gerhard, 3,974,440.
Timpe, Wolfgang, 3,974,436.
Wagner, Karl, 3,974,342.
Winkler, Hans-Werner, 3,974,384.
Witte, Juergen, 3,974,485.
Sievertsson, Hans: *See*—
Folkers, Karl; and Sievertsson, Hans, 3,974,135.
SIG Schweizerische Industrie-Gesellschaft: *See*—
Auckenthaler, Robert, 3,973,474.
Sill, Arthur D.: *See*—
Fleming, Robert W.; Sill, Arthur D.; and Sweet, Francis W., 3,974,186.
Silva, William; and Conrath, Richard L., to Fedders Corporation. Control device for static dry feature. 3,973,330, Cl. 34-55.000.
Silverman, Richard S.: *See*—
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 3,974,352.
Silvestri, George J., Jr., to Westinghouse Electric Corporation. Cycle improvement for nuclear steam power plant. 3,973,402, Cl. 60-678.000.
Silvestri, Victor J.: *See*—
Zirinsky, Stanley; Irene, Eugene A.; and Silvestri, Victor J., 3,974,003.
Simon, Hans. Strip for springy contacts. 3,973,919, Cl. 29-193.500.
Simplex Time Recorder Company: *See*—
Willmann, Erich; and Trischler, Gunter, 3,974,362.
Simpson, Verne G.: *See*—
Razzano, John S.; and Simpson, Verne G., 3,974,120.
Singer Company, The: *See*—
Goldfischer, Lester I., 3,974,500.
Prichard, Richard J., 3,973,505.
Sipe, John Joseph, to Smithkline Corporation. Load signaling device for a patient's foot. 3,974,491, Cl. 340-272.000.
Sitikov, Valentin Kuzmic: *See*—
Volpin, Mark Afimovic; Hetflejs, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.
SKF Industrial Trading and Development Company, B.V.: *See*—
Ernst, Horst; Brandenstein, Manfred; and Olschewski, Armin, 3,973,659.
Skinner, Harold R., to Textron, Inc. Hand-held oscillating tool. 3,973,444, Cl. 74-54.000.
Skinner, Harry W.; and Orn, Max D., to Skinner, Harry W. Pipe joint sealing device. 3,973,783, Cl. 277-190.000.
Slaats, Mathew A.; and Slayton, J. Richard, to Kimball International, Inc. Saw. 3,973,455, Cl. 83-56.000.
Slayton, J. Richard: *See*—
Slaats, Mathew A.; and Slayton, J. Richard, 3,973,455.
Sliger, Boyd P., to Robertshaw Controls Company. Vent valve arrangement. 3,973,729, Cl. 236-34.500.
Slomski, Waclaw Kazimierz. Equipment for testing the kinesthetic abilities of a person's extremities. 3,973,332, Cl. 35-22.00R.
Slosberg, David K.: *See*—
Stevens, James; and Slosberg, David K., 3,974,312.
Smith, Derek Anthony: *See*—
Chase, Michael John; Smith, Derek Anthony; and Dudley, Michael Alan, 3,973,397.
Smith, Donald Awalt. Cutting tool adaptor. 3,973,784, Cl. 279-1.00A.
Smith, Harry: *See*—
Buckle, Derek Richard; Smith, Harry; and Cantello, Barrie Christian Charles, 3,974,289.
Smith, Jack R.: *See*—
Reed, Terry J.; and Smith, Jack R., 3,973,391.
Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Composition for forming thermo-particulating coating which protects electrical apparatus. 3,973,438, Cl. 73-339.00R.
Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Metal acetyl acetonate composition for forming thermoparticulating coating. 3,973,439, Cl. 73-339.00R.
Smith, Joseph E., to Excellon Industries. Drill changing device. 3,973,863, Cl. 408-241.00R.
Smith, Robert L., to Powers, Billy G., a part interest. Roofing shingle. 3,973,369, Cl. 52-526.000.
Smith, Roger Q.: *See*—
Bartasevich, William E.; Edgell, James E.; Jones, John E.; Lineback, Lynn D.; and Smith, Roger Q., 3,973,378.
Smith, Stanley K., to Standard Pressed Steel Co. Tightening system with quality control apparatus. 3,973,434, Cl. 73-139.000.
Smithkline Corporation: *See*—
Sipe, John Joseph, 3,974,491.
Snam Progetti S.p.A.: *See*—
Rivola, Luigi; and Notari, Bruno, 3,974,216.
Snell, George J., to Lummus Company, The. Leaching of copper ores to recover sulfur and silver catalyst. 3,974,253, Cl. 423-27.000.
Snell, George J.: *See*—
Sze, Morgan C.; and Snell, George J., 3,974,073.
Snell, Raymond Lee, to Miles Laboratories, Inc. Process for conditioning bacterial cells containing glucose isomerase activity. 3,974,036, Cl. 195-65.000.

Sobukawa, Masahiro: *See—*
Suzuki, Tsutomu; Matsumoto, Takeo; and Sobukawa, Masahiro, 3,973,456.
Societe Anonyme Coignet: *See—*
Tardieu, Andre, 3,974,247.
Societe CYBCO: *See—*
Ledieu, Jean; and Eschenbrenner, Philippe, 3,974,481.
Societe d'Exploitation des Brevets Neiman SA: *See—*
Lipschutz, Paul, 3,974,348.
Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
Duport, Jacques, 3,973,405.
Societe Soberal S.A.: *See—*
Zephinie, Gerard, 3,973,644.
Soder, Eickhardt: *See—*
Bronner, Karlheinz; Grassme, Ulrich; and Soder, Eickhardt, 3,974,387.
Soderquist, Dean G.: *See—*
Jacobs, G. Richard; Peck, Cluff; and Soderquist, Dean G., 3,973,840.
Sokol, Phillip Edward: *See—*
Block, Ira Jordan; and Sokol, Phillip Edward, 3,974,128.
Sokolov, Uriel: *See—*
Cestaro, John P.; and Sokolov, Uriel, 3,973,991.
Sokolsky, Dmitry Vladimirovich; Dorfman, Yakov Avraamovich; and Kazantseva, Irina Anatolievna. Process for liquid phase purification of carbide acetylene and compositions therefor. 3,974,085, Cl. 252-186.000.
Solomon, Ralph E., to Jade Controls, Inc. Thermocouple with improved hot junction. 3,973,997, Cl. 136-228.000.
Solov, Irving; and Dinstman, Hyman. Wrist watch push-button device. 3,974,351, Cl. 200-159.00R.
Sommer, Udo: *See—*
Schwille, Dieter; Seiz, Hermann; Sorg, Ewald; and Sommer, Udo, 3,974,294.
Sony Corporation: *See—*
Hongu, Masayuki; and Niimura, Tsutomu, 3,974,460.
Kamimura, Kazuhiko; and Yoshida, Tadao, 3,974,455.
Kuroyanagi, Kunihiro, 3,974,520.
Ohsawa, Mitsuo, 3,974,453.
Sugimoto, Yasuo, 3,973,822.
Takeda, Masashi; and Akagiri, Kenzo, 3,974,400.
Soquenne, Maurice. Multi-purpose prefabricated electrical installation. 3,973,818, Cl. 339-22.00B.
Sorenson, Gerald T. Fluid control system. 3,973,583, Cl. 137-312.000.
Sorg, Ewald: *See—*
Schwille, Dieter; Seiz, Hermann; Sorg, Ewald; and Sommer, Udo, 3,974,294.
Sorin, Victor Basil: *See—*
May, Carl Jerome, Jr.; and Sorin, Victor Basil, 3,974,333.
Sosenko, Mikhail Nikolaevich: *See—*
Balashov, Vladimir Nikolaevich; Gavich, Valery Timofeevich; Glyzdov, Igor Mitrofanovich; Dyatlov, Vladimir Semenovich; Ermakov, Verlen Nikolaevich; Kushelev, Jury Nikolaevich; and Sosenko, Mikhail Nikolaevich, 3,974,482.
Southampton Manufacturing Company, Inc.: *See—*
Camp, Stafford V., III, 3,973,893.
Southgate, Robert: *See—*
Nayler, John Herbert Charles; Pearson, Michael John; and Southgate, Robert, 3,974,154.
Southwire Company: *See—*
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 3,973,679.
Souza, Anthony J.; and Robertson, J. Hibbard, to Woodstream Corporation. Animal-run trigger assembly for rotating-frame type animal traps. 3,973,352, Cl. 43-92.000.
Sowa, Michael William, to Union Carbide Corporation. Compound for pinhole-free rotational casting. 3,974,114, Cl. 260-23.00H.
Spaar, Hermann, to Clouth Gummiwerke AG. Conveyor belt. 3,973,670, Cl. 198-193.000.
Sparks, Buddy G.; and Carlton, Lewis M., to Frank W. Murphy Manufacturer, Inc. Engine shut-down device. 3,973,550, Cl. 123-198.0DB.
Speichert, Hugo: *See—*
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.
Spencer, David R.: *See—*
Archer, Wesley L.; and Spencer, David R., 3,974,230.
Spencer, John; Ruepp, Ferdinand; and Whewell, Robert, to David Gessner Company. Web abrading assembly. 3,973,359, Cl. 51-75.000.
Sperry Rand Corporation: *See—*
Askowith, Burton J.; Ellis, Merphis C.; Oberlies, Robert H.; Peterson, Frank A.; and Prasad, Parmanand, 3,974,330.
Mahoney, Ralph W., 3,973,487.
Spies, Klaus: *See—*
Korner, Otto; Benninghoff, Fritz; and Spies, Klaus, 3,973,807.
Spietschka, Ernst: *See—*
Ische, Friedrich; and Spietschka, Ernst, 3,974,177.
Springer, William E.: *See—*
Walter, Henry J.; and Springer, William E., 3,973,528.
Square D Company: *See—*
Stanback, Harris I.; and Campbell, Paul K., 3,973,823.
Srinivasan, Subramanian; and Steiger, Fred H., to Personal Products Company. Wrapped sanitary napkins. 3,973,567, Cl. 128-290.00R.
Staalkat B.V.: *See—*
Jellema, Auke; and van der Schoot, Jelle, 3,973,667.
Staats, Henry N.; and Newcomb, Robert K., to General Binding Corporation. Bookbinding system. 3,973,787, Cl. 281-21.00R.
Staege, Hermann; and Goeke, Eberhard, to Krupp-Koppers GmbH. Processes for the production of methane-containing gases. 3,973,923, Cl. 48-197.00R.
Stal-Laval Apparat AB: *See—*
Bratthall, Lars; Henriksson, Erik; and Ingesson, Lars Olof, 3,973,624.
Stalley, Anthony Donald; and Young, Michael Anthony Richard, to Quantel Limited. Interconnection of circuit boards. 3,973,817, Cl. 339-14.00R.
Stamm, Otto: *See—*
Moller, Willi; and Stamm, Otto, 3,973,555.
Stanback, Harris I.; and Campbell, Paul K., to Square D Company. Electrical terminal connector. 3,973,823, Cl. 339-276.00T.
Standard Oil Company: *See—*
Griffith, Russell K.; and Jones, John F., 3,974,239.
Standard Oil Company (Indiana): *See—*
Wang, Chen-Shen, 3,974,121.
Standard Pressed Steel Co.: *See—*
Smith, Stanley K., 3,973,434.
Stangeland, Bruce E.: *See—*
Powell, Bruce E.; and Stangeland, Bruce E., 3,974,065.
Stansfield, Stephen Raymond, to J. Lyons & Company Limited. Conveyor for articles of different sizes. 3,973,668, Cl. 198-106.000.
Star Seimitsu Kabushiki Kaisha: *See—*
Shigemori, Youjiro; and Mitumori, Yoshio, 3,974,499.
Starkweather, Gary Keith, to Xerox Corporation. Flat field scanning system. 3,973,825, Cl. 350-6.000.
Starkweather, Gary Keith, to Xerox Corporation. Scanning system for imaging characters combined with graphic curves. 3,974,506, Cl. 346-45.000.
Staudenmayer, William J.: *See—*
Contois, Lawrence E.; Rule, Norman G.; and Staudenmayer, William J., 3,973,962.
Staut, Ronald; and Morgan, Peter E. D., to General Refractories Company. $LaCrO_3$ electrodes and method of manufacture. 3,974,108, Cl. 252-521.000.
Stedtnitz, Wolfgang: *See—*
Busch, Carl Wilheim; and Stedtnitz, Wolfgang, 3,974,473.
Steer, Peter, to Everett Medical Products Limited. Winged cannula with skin securing means. 3,973,565, Cl. 128-214.400.
Steere, Robin Charles: *See—*
Coen, Ernesto; Parry, Joseph; and Steere, Robin Charles, 3,973,942.
Steffen, David E., to Dickey-john Corporation. Solid state seed sensor. 3,974,377, Cl. 250-222.00R.
Steiger, Fred H.: *See—*
Srinivasan, Subramanian; and Steiger, Fred H., 3,973,567.
Steinemann, Samuel; and Peter, Martin, to Institut Dr. Ing. Reinhard Straumann, A.G. Paramagnetic alloy. 3,974,001, Cl. 148-32.500.
Steinke, Theodore D.; and Carter, Melvin A., to Kaiser Aluminum & Chemical Corporation. System for melting metal. 3,973,763, Cl. 266-233.000.
Steinmaier, Walter, to U.S. Philips Corporation. Method of manufacturing a semiconductor device having at least one insulated gate field effect transistor, and semiconductor device manufactured by using the method. 3,974,516, Cl. 357-42.000.
Stendel, Wilhelm: *See—*
Hoffmann, Hellmut; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,974,171.
Stephens, George D., IV: *See—*
Stewart, Solomon Lan, 3,973,639.
Sterling Drug Inc.: *See—*
Crounse, Nathan N.; and Desai, Kantilal B., 3,974,144.
Stermole, Franklin J.: *See—*
Roy, Donald W.; and Stermole, Franklin J., 3,974,249.
Sternberg, Moshe, to Miles Laboratories, Inc. Recovery purification of cheese whey protein from protein-polycarboxylic acid precipitates. 3,974,134, Cl. 260-112.00R.
Sterritt, Graham M. Eye-hand perceptual-motor training device. 3,973,334, Cl. 35-35.00R.
Stervinou, Gregory J.: *See—*
Johnson, Donald L.; Broyles, Donald L.; Stervinou, Gregory J.; Bigge, Barton; and Reynolds, David, 3,973,367.
Stevens, James; and Slosberg, David K., to Pandel-Bradford, Inc. Artificial tennis-playing court and process. 3,974,312, Cl. 428-91.000.
Stevenson, Billy E.; and Rumsey, Thomas R., to Royal Industries, Inc. Motor vehicle security system and security method. 3,973,805, Cl. 303-9.000.
Stewart, Solomon Lan, to Mangum, John W.; and Stephens, George D., IV, part interest to each. Coupler for detachable connecting two single axle driven tractors as a single four wheel drive vehicle. 3,973,639, Cl. 180-14.00R.
Steydle, Guy: *See—*
Poisson, Bernard; and Steydle, Guy, 3,973,858.
Stillman, Neil W.: *See—*
Elliott, Joseph E.; Stillman, Neil W.; and Bennett, John E., 3,974,051.
Stoepel, Kurt: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 3,974,278.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,974,290.

Stone, Laurie. Twist-top container. 3,973,724, Cl. 229-39.00R.
Storimans, Franciscus Jozef A., to Frank Storimans Limited. Feed mechanism for component parts. 3,973,457, Cl. 83-411.00R.
Storm, Roger S.: *See—*
Cottis, Steve G.; Economy, James; Storm, Roger S.; and Wohrer, Luis C., 3,974,250.
Stouffer, Ronald D.; and Bauer, Peter, to Bowles Fluidics Corporation. Swept jet oral irrigator. 3,973,558, Cl. 128-66.000.
Stowe, Charles Terry. Mat cutting apparatus. 3,973,459, Cl. 83-455.000.
Strachan, Ronald A., to Ideal Industries, Inc. Method of making a fuse puller. 3,973,318, Cl. 29-437.000.
Straley, Larry W.: *See—*
Arnold, Richard B.; and Straley, Larry W., 3,973,601.
Strauff, Gunther, to Langen & Co. Control valve. 3,973,589, Cl. 137-596.000.
Strausburg, Larry D., to Monarch Marking Systems, Inc. Tag attacher. 3,973,710, Cl. 227-67.000.
Streck, Roland; and Weber, Heinrich, to Chemische Werke Huls Aktiengesellschaft. Catalyst for the preparation of polyalkenamers. 3,974,092, Cl. 252-429.00B.
Streck, Roland; and Weber, Heinrich, to Chemische Werke Huls Aktiengesellschaft. Catalyst system for the production of polyalkenamers. 3,974,094, Cl. 252-429.00B.
Streck, Roland: *See—*
Kuepper, Friedrich-Wilhelm; and Streck, Roland, 3,974,231.
Streltsov, Vladimir Semenovich: *See—*
Ulyanitsky, Evgeny Mefodievich; Streltsov, Vladimir Semenovich; Belichenko, Vladimir Ivanovich; and Mikhailov, Vladimir Vladimirovich, 3,974,423.
Stringer, Roy Ernest, to Chrysler United Kingdom Limited. Air conditioning systems for motor vehicles. 3,973,620, Cl. 165-42.000.
Stripper Insert Corporation: *See—*
Eller, Stanley H., 3,973,454.
Stritzke, Walter: *See—*
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.
Strizhak, Leonid Yakovlevich: *See—*
Seleznev, Konstantin Pavlovich; Galerkin, Jury Borisovich; Strizhak, Leonid Yakovlevich; and Zuev, Anatoly Vasilievich, 3,973,872.
Stroiazzo, Bernard: *See—*
Furchner, Helmut; and Stroiazzo, Bernard, 3,973,927.
Stroszynski, Joachim, to Hoechst Aktiengesellschaft. Process and apparatus for the manufacture of a series of photoconductor webs. 3,973,961, Cl. 96-1.500.
Struger, Odo J.; and Searcy, William W., to Allen-Bradley Company. Programmable sequence controller. 3,974,484, Cl. 340-172.500.
Stuard, Charles Donald: *See—*
Johnson, Charles Louis; and Stuard, Charles Donald, 3,973,719.
Stuemky, Robert E., to Gates Rubber Company, The. Coupling for flexible shaft element. 3,973,411, Cl. 64-4.000.
Stumpf, Richard J.; Watson, Waldon O.; and Leonard, Robert J., to MCA Systems, Inc. Special effects generation and control system for motion pictures. 3,973,839, Cl. 352-5.000.
Sturel, Bernard, to Compagnie Generale d'Electricite. Laser amplifiers. 3,974,454, Cl. 330-4.300.
Sturm, Walter, to Original Hanau Quarzlampen GmbH. Device for measuring the irradiation energy impinged upon a target within a fixed period. 3,974,375, Cl. 250-206.000.
Sturmath, Ranier: *See—*
Jarchow, Friedrich G. K.; Haensel, Dietrich; Hempelmann, Willi; Sturmath, Ranier; Ringlebcn, Hans; and Knabel, Walter, 3,974,011.
Subramanian, Gopal; and McAfee, John Gilmore, to Research Corporation. Bone-seeking technetium-99m imidodiphosphonate complex. 3,974,268, Cl. 424-1.000.
Suda, Seiji, to Hitachi, Ltd. Ignition system for internal combustion engines. 3,973,544, Cl. 123-148.0CB.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, to American Cyanamid Company. Control of corrosion and scale in circulating water systems by means of partial esters of polyfunctional organic acids. 3,974,083, Cl. 252-180.000.
Sugihara, Kanji: *See—*
Sato, Kunio; Ishida, Tomio; and Sugihara, Kanji, 3,974,105.
Sugihara, Kunihiko; Nakajima, Yasuo; Hayashi, Yoshimasa; and Nagumo, Shin-ichi, to Nissan Motor Co., Ltd. Exhaust gas recirculation system. 3,973,535, Cl. 123-119.00A.
Sugimoto, Yasuo, to Sony Corporation. Terminal apparatus. 3,973,822, Cl. 339-274.000.
Sugino, Tadaaki: *See—*
Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, 3,974,332.
Suhel, Peter, to "Gorenje" tovarna gospodinjske opreme. Circuit arrangement for an automatic integrated intravaginal stimulator. 3,973,571, Cl. 128-408.000.
Sukornick, Bernard: *See—*
Eibeck, Richard E.; Fox, William B.; and Sukornick, Bernard, 3,974,265.
Sullivan, Alfred Bay: *See—*
Campbell, Robert Henry; and Sullivan, Alfred Bay, 3,974,170.
Sullivan, Arthur Francis; and Brockett, Frank Howard, III, to International Nickel Company, Inc., The. Mining concentrator. 3,973,575, Cl. 37-58.000.
Sullivan, William A.; Cassano, James R.; and Kingsland, David O., to Xerox Corporation. Electrostatic master making apparatus. 3,973,846, Cl. 355-16.000.
Sulzer Brothers Limited: *See—*
Konig, Ferdinand, 3,974,422.
Pfarrwaller, Erwin, 3,973,598.
Pfarrwaller, Erwin, 3,973,599.
Sumikin-Kiko Co., Ltd.: *See—*
Kajimoto, Isamu; and Morii, Hideaki, 3,973,485.
Sumitomo Chemical Company, Limited: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 3,974,145.
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.
Yamazaki, Noboru; and Higashi, Fukuji, 3,974,219.
Sun Oil Company (Delaware): *See—*
Hardy, William C.; Schultze, Edward F.; and Shepard, John C., 3,973,627.
Sunne Gummifabrik AB: *See—*
Dahlquist, Lars Christer, 3,973,642.
Suominen, Heikki Samuli. Apparatus for supporting and opening plastic bags. 3,973,376, Cl. 53-385.000.
Super Products Corporation: *See—*
Moore, Lionel G., Jr.; and Flynn, Thomas P., 3,973,935.
Supra Aktiebolag: *See—*
Lofberg, Gustaf Gerhard, 3,973,609.
Surland, George John: *See—*
Lussier, Roger Jean; Magee, John Storey, Jr.; Albers, Edwin Wolf; and Surland, George John, 3,974,099.
Surmatis, Joseph Donald; and Walser, Armin, to Hoffmann-La Roche Inc. Trimethyl-1,4-dioxaspiro[4,5]dec-7-en-8-methanol. 3,974,181, Cl. 260-340.900.
Sussmuth, Reiner W., to Amtel, Inc. Deburring tool. 3,973,861, Cl. 408-154.000.
Sutch, Brian Leo Chudleigh, to Airfix Industries Limited. Containers. 3,973,689, Cl. 215-317.000.
Suzaki, Kazuhiko: *See—*
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, 3,974,188.
Suzuki, Ikuo: *See—*
Asaeda, Toshio; Suzuki, Ikuo; and Imai, Tomoyasu, 3,973,925.
Suzuki, Jun: *See—*
Furuya, Teruo; Suzuki, Jun; and Tanimoto, Michio, 3,973,713.
Suzuki, Nobuo, to Technical Incorporated. Automatic switch-off system in a cassette tape recorder. 3,973,743, Cl. 242-186.000.
Suzuki, Takeshi; Tanaka, Hiroshi; and Kudo, Makoto, to Tokyo Shibaura Electric Co., Ltd. Making shadow mask with slit-shaped apertures for CRT. 3,973,965, Cl. 96-36.100.
Suzuki, Tsutomu; Matsumoto, Takeo; and Sobukawa, Masahiro, to Tokyo Shibaura Electric Co., Ltd. Coil-like article supply device. 3,973,456, Cl. 83-209.000.
Suzuki, Yasuo, to Kabushiki Kaisha Komatsu Seisakusho. Operator's cab in a construction vehicle. 3,973,796, Cl. 296-28.00C.
Suzuki, Yasuo: *See—*
Arimura, Iwao; and Suzuki, Yasuo, 3,974,018.
Suzuki, Yuichi: *See—*
Henmi, Zenzo; Sasaki, Tatsuji; Okada, Masanori; Kassai, Makoto; and Suzuki, Yuichi, 3,974,000.
Svenska Rotor Maskiner Aktiebolag: *See—*
Nilsson, Hans Robert; and Pamlin, Roland, 3,973,527.
Svoboda, Petr: *See—*
Volpin, Mark Afimovic; Hetfleja, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, 3,974,095.
Swedberg, Nils Einar, to Eaton Corporation. Drive connection means for a hydraulic device. 3,973,880, Cl. 418-61.00B.
Sweet, Francis W.: *See—*
Fleming, Robert W.; Sill, Arthur D.; and Sweet, Francis W., 3,974,186.
Swiss Aluminium Ltd.: *See—*
Alder, Hanspeter, 3,974,046.
Gygax, Hans-Rudolf; and Peregi, Gyorgy, 3,973,847.
Switzer, George W., to Gilbert Associates Inc. Method and apparatus for comminution of coal and other materials to ultrafine sizes. 3,973,733, Cl. 241-1.000.
Swodenk, Wolfgang: *See—*
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 3,974,224.
Sybron Corporation: *See—*
Puskas, Joseph Emil; Shibe, William J., Jr.; and Wood, William, 3,974,131.
Syntex Puerto Rico Inc.: *See—*
Mathes, Stanley, 3,973,566.
Syntex (U.S.A.) Inc.: *See—*
McCarty, James C.; and Monaco, George, 3,973,519.
Szabo, Kalman; and Volgyi, Janos. Method for temperature control of refrigerating machines operating with thermoelectric modules. 3,973,938, Cl. 62-3.000.
Sze, Morgan C.; and Snell, George J., to Lummus Company, The. Coal liquefaction. 3,974,073, Cl. 210-73.00R.
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, to Instyut Ciezkiej Syntesy Organiczej "Blachownia". Method for producing methacrylic esters. 3,974,207, Cl. 260-486.00D.
Szykowski, John P.: *See—*
Rutkowski, Alfred J.; and Szykowski, John P., 3,974,081.

Tabler, Charles P., to Kornylak Corporation. Endless cable conveyor with molded lugs. 3,973,669, Cl. 198-130.000.

Tadokoro, Eiichi; and Kitamoto, Tatsuji, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 3,973,920, Cl. 29-194.000.

Tagata, Genichi: *See—*
Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, 3,974,332.

Takagi, Takao: *See—*
Miyatake, Masayuki; Ishizuka, Sengo; and Takagi, Takao, 3,973,981.

Takahara, Ichiro: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.

Takahashi, Akio; Fukuda, Atsushi; and Igarashi, Toshio, to Dipsol Chemicals Co., Ltd. Method for electroplating bright zinc. 3,974,045, Cl. 204-55.00R.

Takahashi, Akira: *See—*
Oyama, Satoshi; and Takahashi, Akira, 3,974,399.

Takahashi, Tetsuo: *See—*
Itoh, Tetsuro; Takahashi, Tetsuo; and Yamano, Kiyoichi, 3,973,950.

Takamatsu, Ikuo; and Yoshida Kogyo Kabushiki Kaisha. Fastener slider. 3,973,300, Cl. 24-205.15R.

Takashima, Kohki: *See—*
Kurita, Hironori; Kawazu, Mitsutaka; and Takashima, Kohki, 3,974,274.

Takatori, Yasushi: *See—*
Haruta, Masahiro; Takatori, Yasushi; Shimosawa, Akemi; Nishide, Katsuhiko; and Nakazawa, Mitsunobu, 3,974,041.

Take, Takao: *See—*
Yano, Tsuyoshi; Ichikawa, Kazumasa; Take, Takao; and Sasano, Tetsuro, 3,974,024.

Takeda, Hideo: *See—*
Yanagihara, Kazuhiko; and Takeda, Hideo, 3,973,437.

Takeda, Masashi; and Akagiri, Kenzo, to Sony Corporation. Limiter circuit. 3,974,400, Cl. 307-237.000.

Takeda, Yoshiro: *See—*
Ohkawa, Masaaki; Konishi, Seizo; Hirabayashi, Kazuyoshi; Abeta, Sadaharu; Okaniwa, Tetsuo; and Takeda, Yoshiro, 3,974,178.

Takeuchi, Ryoichi: *See—*
Ito, Kanichi; Hirayama, Yoshio; Takeuchi, Ryoichi; and Nomoto, Masao, 3,973,735.

Takeuchi, Shiro: *See—*
Ueda, Toshitsugu; and Takeuchi, Shiro, 3,974,425.

Takeuchi, Tomio: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,973,608.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,974,184.

Taki, Tomohiko, to Hitachi, Ltd. Automatic pumping device. 3,973,877, Cl. 417-38.000.

Tallante, Miguel Fernandez: *See—*
de la Cuadra Herrera, Antonio; Tallante, Miguel Fernandez; and Sanchez, Armando Rodriguez, 3,974,254.

Tamehiro, Hiroshi: *See—*
Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, 3,973,999.

Tameo, Gerald N., to Sheldahl, Inc. Radial line punch. 3,973,453, Cl. 83-30.000.

Tamlyn, Arthur John Norman: *See—*
Samways, Bruce; Sanderson, Edward George; and Tamlyn, Arthur John Norman, 3,974,118.

Tamny, Simon Z.: *See—*
Crum, Gerald W.; Nord, Eric T.; Reighard, Alan B.; and Tamny, Simon Z., 3,973,697.

Tanabe Seiyaku Co., Ltd.: *See—*
Kurita, Hironori; Kawazu, Mitsutaka; and Takashima, Kohki, 3,974,274.

Tanaka, Haruo: *See—*
Omura, Satoshi; Tanaka, Haruo; Awaya, Juichi; Konda, Yaeko; Narimatsu, Yoshitsugu; and Onda, Masayuki, 3,974,273.

Tanaka, Hiroshi: *See—*
Suzuki, Takeshi; Tanaka, Hiroshi; and Kudo, Makoto, 3,973,965.

Tanaka, Kenichi, to Kakuichi Mfg. Co., Ltd. Apparatus for manufacturing plastic pipes. 3,974,019, Cl. 156-429.000.

Tanaka, Mitsuo: *See—*
Onoda, Seiichi; Tanaka, Mitsuo; and Imoto, Katsuyuki, 3,973,828.

Tanaka, Toshiharu, to Matsushita Electric Industrial Co., Ltd. Electrochemical reed filter. 3,974,466, Cl. 333-72.000.

Tanaka, Yutaka: *See—*
Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, 3,974,206.

Tanigawa, Shizuhiko; Yamazoe, Yoshinori; and Nakamura, Chihiro, to Matsushita Electric Industrial Co., Ltd. Method of assembling a flat plate type rotary transformer. 3,974,017, Cl. 156-309.000.

Tanikella, Murty S.; and Von Susani, Odorich, to Du Pont de Nemours, E. I., and Company. Alkylene oxide condensates of tetramethylpiperidine alcohols or glycols. 3,974,127, Cl. 260-75.00N.

Tanimoto, Michio: *See—*
Furuya, Teruo; Suzuki, Jun; and Tanimoto, Michio, 3,973,713.

Tappan Company, The: *See—*
Caselani, Richard E.; Gilliom, John W.; McFarland, Robert H.; and Perl, Richard L., 3,973,551.

Tardieu, Andre, to Societe Anonyme Coignet. Process for shaping components made of concrete or mortar. 3,974,247, Cl. 264-28.000.

Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, to Mitsubishi Gas Chemical Company, Inc. Process for the thermal decomposition of thermoplastic resins with a heat transfer medium. 3,974,206, Cl. 260-486.00R.

Tatsuno, Tadayoshi: *See—*
Inamura, Keizo; Tatsuno, Tadayoshi; and Okoshi, Toshio, 3,974,306.

Tatsuzawa, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. FM television telephone system. 3,974,337, Cl. 179-2.0TV.

Taylor, Gordon Joseph. Vehicle valve-stem retaining device. 3,973,614, Cl. 152-427.000.

TDN, Inc.: *See—*
Cranberg, Lawrence, 3,974,392.

Technical Incorporated: *See—*
Suzuki, Nobuo, 3,973,743.

Teckton, Inc.: *See—*
Goltsos, Costas E., 3,974,353.
Goltsos, Costas E., 3,974,358.

Teer, Glenn Edward; Higgins, Jerry Gene; and Warren, George D., to Cosden Technology, Inc. Ethylene-styrenic-alkyl vinyl terpolymer emulsions having particle size of 100 to about 100 angstrom units. 3,974,119, Cl. 260-29.6RB.

Teldix GmbH: *See—*
Wehde, Heinz, 3,974,406.

Telefonaktiebolaget L M Ericsson: *See—*
Lofmark, Bengt Gustav, 3,974,447.
Mersich, Laszlo, 3,974,344.

Teletype Corporation: *See—*
De Boo, Jerome L.; Feldy, Edmund C.; and Grear, Horace Stanley, 3,973,661.
Wanat, Robert R., 3,973,664.

Tell, Lars Erik Karl Axel: *See—*
Thorsell, Sven-Erik; and Tell, Lars Erik Karl Axel, 3,973,737.

Teranishi, Junichi, to Murata Kikai Kabushiki Kaisha. Cover for yarn twisting machine. 3,973,381, Cl. 57-58.830.

Terminiello, Michael A., to BASF Wyandotte Corporation. Manufacture of high-density foamed polymer. 3,973,884, Cl. 425-4.00R.

Terneu, Robert: *See—*
Jacquemin, Francis; Terneu, Robert; and Voiturier, Jean-Pierre, 3,974,316.

Tess, Peter, to Oberschwabische Metallwarenfabrik GmbH & Co. KG. Pressure-cooker. 3,973,694, Cl. 220-206.000.

Texaco Inc.: *See—*
Harnsberger, Bobby G., 3,973,311.
Quisenberry, Robert E., 3,974,061.

Texas Instruments Incorporated: *See—*
Holland, Varnum Smith, 3,974,439.
Wagers, Robert S.; and Hartmann, Clinton S., 3,974,464.

Textron, Inc.: *See—*
DeCaro, Charles J., 3,973,605.
Skinner, Harold R., 3,973,444.

Thanghe, Arthur E. Demolition tool. 3,973,315, Cl. 29-239.000.

Thayer, Edward B., to United Technologies Corporation. Flap-type two-dimensional nozzle. 3,973,731, Cl. 239-265.390.

Theobald, Donald David, to Ilford Limited. Paper material dryer. 3,973,328, Cl. 34-4.000.

Thermo Electron Corporation: *See—*
Fine, David H., 3,973,910.

Thielecke, Jorg: *See—*
Heibel, Helmut; and Thielecke, Jorg, 3,973,578.

Thomas & Betts Corporation: *See—*
Noorily, Peter, 3,973,293.

Thomas, Donald Ralph, to International Business Machines Corporation. Conductive line width and resistivity measuring system. 3,974,443, Cl. 324-64.000.

Thomas, Frank J.; and Farrow, Max W., to Martin Marietta Corporation. Line scan area signature detection system. 3,974,328, Cl. 178-6.800.

Thomas J. Lipton, Inc.: *See—*
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 3,974,300.

Thomas, Telfer Lawson: *See—*
Shetty, Bola Vithal; and Thomas, Telfer Lawson, 3,974,157.

Thompson, Francis T.: *See—*
Putman, Thomas H.; and Thompson, Francis T., 3,973,410.

Thompson, James Edward: *See—*
Obermeier, Albert Anthony; and Thompson, James Edward, 3,973,797.

Thompson, Lionel Raymond Frank, to Hawker Siddeley Dynamics Engineering Limited. Control system for repetitive processes. 3,974,432, Cl. 318-562.000.

Thomson-CSF: *See—*
Pepin, Christian, 3,974,331.

Thon, Robert H.: *See—*
Volkers, Stewart W.; and Thon, Robert H., 3,973,518.

Thornblad, Rolf: *See—*
Krug, Hans; Niklas, Hans; and Thornblad, Rolf, 3,973,992.

Thorne, David Edward: *See—*
Engel, Kurt; and Thorne, David Edward, 3,974,282.

Thorsell, Sven-Erik; and Tell, Lars Erik Karl Axel, to Aktiebolaget Karlstads Mekaniska Werkstad. Pulp grinder. 3,973,737, Cl. 241-294.000.

Thumm, Heinrich: *See—*
Zimmermann, Hans; Thumm, Heinrich; and Roth, Kurt, 3,973,902.

Tichenor, George Humphrey. Portable hand knitting device. 3,973,413, Cl. 66-1.00A.
Tidwell, James T., to Trane Company, The. Method of making a gas-fired furnace. 3,973,918, Cl. 29-157.30D.
Tiers, George V. D.; and Wiese, Joseph A., Jr., to Minnesota Mining and Manufacturing Company. Reduced styryl dyes. 3,974,147, Cl. 260-240.00D.
Till, Henry R.: *See—*
Lindblad, Nero R.; Till, Henry R.; and Beatty, Charles L., 3,973,845.
Timpe, Wolfgang, to Siemens Aktiengesellschaft. Circuit arrangement for an electric melting furnace. 3,974,436, Cl. 321-13.000.
Tipton, Harold W., to United States of America, Health, Education and Welfare. Radiation safety shield for a syringe. 3,973,554, Cl. 128-1.100.
Tobita, Susumu; Shimoishizaka, Masashi; Oishi, Isamu; Miwa, Keiichi; and Kanda, Hideo, to Furukawa Electric Co., Ltd., The. Long flexible waveguide. 3,974,467, Cl. 333-95.00A.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Onodera, Toshihiro; and Sekikawa, Kazue, 3,974,463.
Suzuki, Takeshi; Tanaka, Hiroshi; and Kudo, Makoto, 3,973,965.
Suzuki, Tsutomu; Matsumoto, Takeo; and Sobukawa, Masahiro, 3,973,456.
Watanabe, Sadakazu; Shinoda, Hidenori; and Imasato, Yuichi, 3,973,725.
Tolfsen, Miriam O. Picture frame having a picture mount. 3,973,343, Cl. 40-152.100.
Tomarelli, Rudolph R.: *See—*
Santilli, Arthur A.; Scotese, Anthony C.; and Tomarelli, Rudolph R., 3,974,162.
Tomasetti, Charles Michael: *See—*
Faulkner, Richard Dale; and Tomasetti, Charles Michael, 3,974,411.
Tomassini, Maurizio: *See—*
Greco, Giovanni; and Tomassini, Maurizio, 3,973,320.
Tomlin, Clive Dudley Spencer: *See—*
Barlow, Charles Brian; White, Brian Graham; and Tomlin, Clive Dudley Spencer, 3,974,276.
Tomono, Shiro: *See—*
Kudo, Toshihiro; Higo, Moriaki; Suzaki, Kazuhiko; Tomono, Shiro; and Shinbo, Masafu, 3,974,188.
Tong, Alvin Hu: *See—*
Jackson, Ralph Newton; Kern, Richard Wilhelm; and Tong, Alvin Hu, 3,973,849.
Tooka, Takuzo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Cheese handling method. 3,973,906, Cl. 8-149.300.
Toppan Printing Co., Ltd.: *See—*
Kato, Noriyoshi, 3,973,698.
Toray Industries, Inc.: *See—*
Aizawa, Hideyuki; Kuroda, Akio; Minaga, Masahiro; Ohnishi, Kozi; and Matsuhisa, Seikichi, 3,974,232.
Torazzi, Franco, to Gimac S.p.A. Ripper for tractors and similar vehicles. 3,973,632, Cl. 172-474.000.
Toshida, Shunichi: *See—*
Shimizu, Kazuaki; and Toshida, Shunichi, 3,973,652.
Toshimitsu, Yoshihiko: *See—*
Nishikawa, Masao; Toshimitsu, Yoshihiko; and Aoki, Takashi, 3,973,640.
Toulc'hoat, Alain; and Papot, Michel, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Lacquer hardness testing apparatus. 3,973,432, Cl. 73-81.000.
Toussaint, Herbert: *See—*
Decker, Martin; Schoenleben, Willibald; Toussaint, Herbert; and Hoffmann, Hewig, 3,974,159.
Toyo Ink Manufacturing Co., Ltd.: *See—*
Miyatake, Masayuki; Ishizuka, Sengo; and Takagi, Takao, 3,973,981.
Toyoda Koki Kabushiki Kaisha: *See—*
Asaeda, Toshio; Suzuki, Ikuo; and Imai, Tomoyasu, 3,973,925.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Nakada, Masahiko, 3,973,543.
Trafton, John E.; Nichols, Philip E.; and Haynes, Royce, to American Hospital Supply Corporation. Micro-gasometric method and apparatus. 3,973,912, Cl. 23-230.00B.
Trane Company, The: *See—*
Tidwell, James T., 3,973,918.
Trans Canada Pipelines Limited: *See—*
Porter, Patrick C., 3,973,441.
Trees, Ferdinand Marinus, to U.S. Philips Corporation. Shaving head for a dry-shaving apparatus. 3,973,323, Cl. 30-43.920.
Trekoval, Jiri: *See—*
Lochmann, Lubomir; Coupek, Jiri; and Trekoval, Jiri, 3,974,111.
Tremmel, Robert Arnold, to Oxy Metal Industries Corporation. Bath and method for the electrodeposition of bright nickel-iron deposits. 3,974,044, Cl. 204-43.00T.
Triple Bee & Prestress (Proprietary) Limited: *See—*
Bruinette, Konstant E., 3,973,297.
Trischler, Gunter: *See—*
Willmann, Erich; and Trischler, Gunter, 3,974,362.
Trp, John M.: *See—*
Harjes, Clarence F.; Leach, Harry W.; and Trp, John M., 3,974,032.
True, Martin E.: *See—*
Hill, Tom H.; and True, Martin E., 3,973,586.
Trueman, Roy; Warsop, Colin; Godfrey, Graham; and Prestidge, John Malcolm, to Plessey Handel und Investments A.G. Telecommunication exchange. 3,974,341, Cl. 179-18.00J.
Tsuda, Yuji; Kajiwara, Junji; and Komori, Shigekazu, to Matsushita Electric Industrial Co., Ltd. Automatic exposure control circuit for a camera. 3,974,509, Cl. 354-51.000.
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Electro-optic device. 3,973,830, Cl. 350-160.0LC.
Tsuruda, Mineo: *See—*
Nakanishi, Michio; Oe, Takanori; and Tsuruda, Mineo, 3,974,168.
Tucker, Linwood G., to Koppers Company, Inc. Coke oven door. 3,974,038, Cl. 202-248.000.
Tulowitzki, John: *See—*
Scalzo, Joseph E.; and Tulowitzki, John, 3,973,727.
Turner Research, Inc.: *See—*
Turner, William F., 3,973,531.
Turner, William F., to Turner Research, Inc. Engine with compressor and bypass for combustible mixture. 3,973,531, Cl. 123-43.00A.
Tyler, Hugh J.; and Newell, Dennis E., to Robertshaw Controls Company. Motor protection circuit. 3,974,430, Cl. 318-473.000.
U.I.P. Engineered Products Corporation: *See—*
Breckenfelder, Ernst G., 3,973,887.
Uchida, Hiroshi, to Rigaku Denki Company Limited. Thermobalance. 3,973,636, Cl. 177-132.000.
Uchiyama, Yasuji, to Nippon Gakki Seizo Kabushiki Kaisha. Frequency-deviation method and apparatus. 3,973,462, Cl. 84-1.250.
Ueda, Atsumi, to Aisin Seiki Kabushiki Kaisha. Flow divider valve. 3,973,580, Cl. 137-101.000.
Ueda, Minoru, to Copal Company Limited. Flap type indicating device. 3,973,339, Cl. 40-73.400.
Ueda, Toshitsugu; and Takeuchi, Shiro, to Yokogawa Electric Works, Ltd. Isolator circuit with improved frequency response. 3,974,425, Cl. 317-123.000.
Ueno, Kazuo: *See—*
Tatsumi, Takeichi; Ogawa, Katsuyoshi; Tanaka, Yutaka; Ueno, Kazuo; and Daikoku, Shoji, 3,974,206.
Uetake, Toshifumi, to Olympus Optical Co., Ltd. Incident light fluorescence microscope. 3,973,827, Cl. 350-91.000.
Ulyanitsky, Evgeny Mefodievich; Streltsov, Vladimir Semenovich; Belichenko, Vladimir Ivanovich; and Mikhailov, Vladimir Vladimirovich. Differential current protective device. 3,974,423, Cl. 317-26.000.
Umezawa, Fumio: *See—*
Minagawa, Toyosaku, deceased; Hazaka, Yuzi; and Umezawa, Fumio, 3,973,574.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Microbial production of certain isoflavones. 3,973,608, Cl. 195-80.00R.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Microbial production of certain isoflavones. 3,974,184, Cl. 260-345.200.
Uni-Mist, Inc.: *See—*
Boelkins, Wallace G., 3,973,752.
Union Carbide Corporation: *See—*
Brown, Earle S., 3,974,259.
Coffman, Robert Lee; and Shiffler, Richard Welty, 3,974,080.
Collins, John Joseph, 3,973,931.
McHenry, Edgar Ronald, 3,974,264.
Papa, Anthony Joseph; and Proops, William Robert, 3,974,109.
Sowa, Michael William, 3,974,114.
Uniroyal Inc.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 3,974,287.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Gray, George William; Harrison, Kenneth John; Hulme, David Sanderson; and Raynes, Edward Peter, 3,974,087.
United States Gypsum Company: *See—*
Semmerling, Ralph P., 3,973,302.
United States of America
Army: *See—*
Cucksee, Marjorie T.; and Allen, Henry C., 3,974,004.
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,973,442.
Energy Research and Development Administration: *See—*
Nierenberg, William A.; and Pontius, Rex B., 3,973,928.
Nierenberg, William A., 3,973,934.
Wheeler, John A., 3,974,028.
Health, Education and Welfare: *See—*
Mabie, Curtis P., 3,973,970.
Tipton, Harold W., 3,973,554.
Navy: *See—*
Aisenberg, Sol; and Chang, Kuo Wei, 3,974,458.
Anderson, Matthew E.; and Menz, Fredric L., 3,973,499.
Bates, Alvin G.; and McGovern, Terrence L., 3,974,457.
Briggs, George S., 3,973,501.
Brouillette, Carl V.; and Hochman, Harry, 3,974,323.
Marcus, Rudolph J.; and Gloye, Eugene E., 3,973,466.
McCulloch, Charles R.; and Gill, Robert C., 3,973,510.
U.S. Philips Corporation: *See—*
Holman, Benedictus Timotheus Johannes, 3,974,421.
Poolman, Petrus Jacobus; Abdalla, Nabil Ahmed; and Harrewijne, Arend, 3,974,054.

Steinmaier, Walter, 3,974,516.
Trees, Ferdinand Marinus, 3,973,323.
Van Bakel, Adrianus Maria; Fransen, Jan Josephus Bernardus; and Kuiper, Adrianus, 3,973,816.
van den Bussche, Willem, 3,974,519.
van der Goot, Antonie Sijtze; and Hermans, Peter, 3,974,416.
Van Dijk, Ate, 3,974,327.
van Heusden, Sybrandus, 3,973,914.

United Technologies Corporation: *See—*
Bloomfield, David P.; and Landau, Michael B., 3,973,993.
Ferrar, Carl M., 3,973,851.
Jeroszko, Ronald A., 3,973,390.
Jowett, Terence W.; and Cross, Thomas A., 3,973,848.
Markowski, Stanley J.; and Nolan, James J., 3,973,395.
Thayer, Edward B., 3,973,731.

United Turbine AB & Co., Kommanditbolag: *See—*
Kronogard, Sven-Olof, 3,973,396.

Universal Oil Products Company: *See—*
Bajek, Walter A.; and McLaughlin, James H., 3,974,064.
Brown, Kenneth M.; and Verachtert, Thomas A., 3,974,066.
Vande Ven, John E.; and Fischer, Steven M., 3,973,440.

University of Illinois Foundation: *See—*
von Smolinski, Alfred; and Feng, Kuo-Chuan, 3,973,911.

Upjohn Company, The: *See—*
Kelly, Robert C., 3,974,173.
Magerlein, Barney J., 3,974,189.
Magerlein, Barney J., 3,974,190.
Magerlein, Barney J., 3,974,191.
Magerlein, Barney J., 3,974,192.
Magerlein, Barney J., 3,974,193.
Schneider, William P., 3,974,200.
White, David R., 3,974,146.
Youngdale, Gilbert A., 3,974,195.

Upper, Gerd: *See—*
Burgmann, Feodor; Safft, Klaus; Forch, Hans; and Upper, Gerd, 3,973,779.

Urban, Eugene M., Jr., to Cities Service Company. Manufacture of iron oxides. 3,974,267, Cl. 423-633.000.

Uroshevich, Miroslav: *See—*
Schmidt, Edward C.; and Uroshevich, Miroslav, 3,973,700.

USM Corporation: *See—*
Babson, Edward S.; and Gorini, Robert F., 3,973,285.
Newton, Albert E.; Farnum, Roger L.; and Gelsomini, Nicholas J., 3,973,284.

Uy, James C., to Ford Motor Company. Method of coating a rotary internal combustion engine. 3,974,309, Cl. 427-250.000.

Valdiserri, Leo L., to Borg-Warner Corporation. Process for curing olefin polymers. 3,974,132, Cl. 526-20.000.

Valfre, Cesare. Negative impedance repeater with double amplification, for telephone lines. 3,974,345, Cl. 179-170.00G.

Van Doorne's Bedrijfswagenfabriek Daf B.V.: *See—*
Zelders, Wim, 3,973,536.

Van Bakel, Adrianus Maria; Fransen, Jan Josephus Bernardus; and Kuiper, Adrianus, to U.S. Philips Corporation. Method of gettering a television display tube. 3,973,816, Cl. 316-25.000.

Van Broekhoven, Jacob, to Westinghouse Electric Corporation. Treatment of $Sr_5(PO_4)_3Cl$:Eu luminescent material to improve fluorescent lamp which uses material. 3,974,305, Cl. 427-67.000.

van den Bussche, Willem, to U.S. Philips Corporation. Apparatus for reproducing a PAL color television signal which is recorded on a record carrier and drop out compensation. 3,974,519, Cl. 358-8.000.

Van Den Haak, Johannes, to Curtis Dyna Products, Corporation. Battery checker. 3,974,441, Cl. 324-29.500.

van der Goot, Antonie Sijtze; and Hermans, Peter, to U.S. Philips Corporation. Multiple electrode support members with low coefficient of expansion. 3,974,416, Cl. 313-417.000.

van der Lely, Cornelis; and Nieuwenhoven, Hendricus Jacobus Cornelis. Devices for erecting a building from prefabricated sections. 3,973,680, Cl. 212-76.000.

van der Sande, Jan J., to Astrophysics Research Corporation. Light amplifier for obtaining intensified light image from photoemissive surface. 3,974,376, Cl. 250-213.0VT.

van der Schoot, Jelle: *See—*
Jellema, Auke; and van der Schoot, Jelle, 3,973,667.

Vandervell Products Limited: *See—*
Walmsley, Robert Edwin; Oliver, Robert; and Fisher, Norman Ernest, 3,973,883.

Van der Werf, Loren John; and Rapkin, Myron Colman, to Miles Laboratories, Inc. Method for testing antifreeze. 3,973,909, Cl. 23-230.00R.

Vande Ven, John E.; and Fischer, Steven M., to Universal Oil Products Company. Catalyst sampling method. 3,973,440, Cl. 73-421.00B.

Van Dijk, Ate, to U.S. Philips Corporation. Autofocus circuit for a videodisc playback device. 3,974,327, Cl. 178-6.60R.

Van Gerpen, Harlan Welbert, to Deere & Company. Demand compensated hydraulic system with pilot line dither. 3,973,399, Cl. 60-445.000.

van Heusden, Sybrandus, to U.S. Philips Corporation. Apparatus for the determination of nitrogen oxides in air. 3,973,914, Cl. 23-254.00E.

Van Laeken, Anita C.: *See—*
Flannery, John B.; and Van Laeken, Anita C., 3,973,966.

Van Sorge, Bernardus J., to General Electric Company. Preparation of ortho-alkylated phenols. 3,974,229, Cl. 260-621.00R.

Varian Associates: *See—*
Govignon, Jacques P., 3,973,836.
Wheeler, William R., 3,973,753.

Varta Batterie Aktiengesellschaft: *See—*
Borger, Waldemar; Hullmeine, Udo; and Voss, Ernst, 3,973,990.
Krug, Hans; Niklas, Hans; and Thornblad, Rolf, 3,973,992.

Vasilantone, Michael. Web aligner. 3,973,446, Cl. 74-241.000.

Vater, Wulf: *See—*
Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, 3,974,275.
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 3,974,278.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,974,290.

Vaughan Co., Inc.: *See—*
Vaughan, James E., 3,973,866.

Vaughan, James E., to Vaughan Co., Inc. Centrifugal chopping slurry pump. 3,973,866, Cl. 415-121.00B.

VEB Gummikombinat Berlin: *See—*
Grorich, Kurt, 3,973,781.

Vecchio, Fiore M. Drainage system. 3,973,407, Cl. 210-136.000.

Venor, William J.; Hoppe, John C.; and Blount, William W., Jr., to Eastman Kodak Company. Photographic support comprising polymerized propylene, talc, titanium dioxide, elastomer and antioxidant. 3,973,963, Cl. 96-3.000.

Venuto, Paul B.: *See—*
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,062.
Owen, Hartley; Rosinski, Edward J.; and Venuto, Paul B., 3,974,063.

Verachtert, Thomas A.: *See—*
Brown, Kenneth M.; and Verachtert, Thomas A., 3,974,066.

Veriflo Corporation: *See—*
Ollivier, Louis A., 3,973,579.

Verkuil, Roger L.: *See—*
Curtis, Huntington W.; and Verkuil, Roger L., 3,974,486.

Vespo, James A. Record grooving device. 3,973,325, Cl. 33-27.00M.

Vetco Offshore Industries, Inc.: *See—*
Baugh, Benton F., 3,973,625.

Vodnev, Arkady Dmitrievich: *See—*
Bernadiner, Mikhail Naumovich; Dobrovolsky, Anatoly Alexandrovich; Esilevich, Boris Semenovich; Rubinshtein, Georgy Nesanelovich; Gubarev, Viktor Georgievich; Shipov, Emanuil Ivanovich; Sharov, Petr Mikhailovich; Lurie, Boris Isaevich; Vodnev, Arkady Dmitrievich; Moshkovich, Alexandr Bentsionovich; and Lupanov, Pavel Alexandrovich, 3,974,021.

Vogelsang, Gustav, to Volkswagenwerk Aktiengesellschaft. Reciprocating internal combustion engine with continuous combustion. 3,973,393, Cl. 60-39.630.

Vogt, J. William: *See—*
Owen, James E.; and Vogt, J. William, 3,974,089.

Voigt, John E.; and Bovier, Edward M., to Anheuser-Busch, Incorporated. Starch product by further oxidizing oxidized starch with ammonium persulfate. 3,973,985, Cl. 127-33.000.

Voiturier, Jean-Pierre: *See—*
Jacquemin, Francis; Terneu, Robert; and Voiturier, Jean-Pierre, 3,974,316.

Volgyi, Janos: *See—*
Szabo, Kalman; and Volgyi, Janos, 3,973,938.

Volkers, Stewart W.; and Thon, Robert H., to Xerox Corporation. Cross mixing blending chamber for electrostatic processors and the like. 3,973,518, Cl. 118-637.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Vogelsang, Gustav, 3,973,393.
Weber, Otto; Hartwig, Horst; and Munchenberg, Gunter, 3,973,653.

Volpin, Mark Afimovic; Hetflejs, Jiri; Kolomnikov, Igor Sergeevic; Svoboda, Petr; Sergeev, Vladimir Alexandrovic; and Sitikov, Valentin Kuzmic, to Ceskoslovenska akademie ved; and Akademie Nauk SSSR. Catalyst for hydrogenation, isomerization and hydrosilylation of alkanes, and method of preparation. 3,974,095, Cl. 252-429.00R.

Von Ohlsen, Louis Henry, Jr.: *See—*
Lewis, Basil Charles, Jr.; Mathews, James Robert; and Von Ohlsen, Louis Henry, Jr., 3,974,518.

von Smolinski, Alfred; and Feng, Kuo-Chuan, to University of Illinois Foundation. Sulfur oxide determination. 3,973,911, Cl. 23-230.00R.

Von Susani, Odorich: *See—*
Tanikella, Murty S.; and Von Susani, Odorich, 3,974,127.

Voorhies, Alexis, Jr.; and Hamner, Glen P., to Exxon Research and Engineering Company. Preparation of high V.I. lube oils. 3,974,060, Cl. 208-59.000.

Voss, Ernst: *See—*
Borger, Waldemar; Hullmeine, Udo; and Voss, Ernst, 3,973,990.

VPI Educational Foundation: *See—*
Moore, W. Edward C., 3,973,696.

Vuestamp International Proprietary Limited: *See—*
Rowe, Archie C., 3,973,495.

Vuitel, Laurent: *See—*
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, 3,974,149.

Vydec, Inc.: *See—*
de Cavaignac, Patrick P.; and Dickinson, Peter D., 3,974,493.

W. R. Grace & Co.: *See—*
Lussier, Roger Jean; Magee, John Storey, Jr.; Albers, Edwin Wolf; and Surland, George John, 3,974,099.

W. Schlafhorst & Co.: *See—*
Engelhardt, Dietmar; and Raasch, Hans, 3,973,742.

Waas, Heinrich. Icebreaker vessel. 3,973,509, Cl. 114-42.000.
Waaske, Heinz, to Rollei-Werke Franke & Heidecke. Camera accessory securing means. 3,974,513, Cl. 354-295.000.
Wacker, Werner: *See—*
Schwartz, Werner, 3,973,290.
Wadsworth, Eric: *See—*
Savidge, David Harvey; and Wadsworth, Eric, 3,974,442.
Wagers, Robert S.; and Hartmann, Clinton S., to Texas Instruments Incorporated. Acoustic ridge waveguide. 3,974,464, Cl. 333-30.00R.
Wagner, Karl, to Siemens Aktiengesellschaft. Switching arrangement for telecommunications systems. 3,974,342, Cl. 179-18.0FH.
Wakeman, Reginald L.: *See—*
Dudzinski, Zdzislaw; and Wakeman, Reginald L., 3,974,208.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Bayer Aktiengesellschaft. Process for preparing aldehydes from oxirane compounds. 3,974,224, Cl. 260-601.00R.
Walker, Grant W. Tubular member and process of forming a tubular member. 3,973,596, Cl. 138-174.000.
Walmsley, Robert Edwin; Oliver, Robert; and Fisher, Norman Ernest, to Vandervell Products Limited. Rotary piston machines. 3,973,883, Cl. 418-178.000.
Walser, Armin: *See—*
Surmatis, Joseph Donald; and Walser, Armin, 3,974,181.
Walt Disney Productions: *See—*
Ball, Kenneth H., 3,973,746.
Walter, Henry J.; and Springer, William E., to Clairol Incorporated. Styling apparatus for hair. 3,973,528, Cl. 132-11.00R.
Walters, Donald M.: *See—*
Rinehimer, Elwood; Walters, Donald M.; and Jarrett, Kenneth L., Sr., 3,973,506.
Walters, Robert P.: *See—*
Seward, Gerald J.; and Walters, Robert P., 3,973,803.
Wan, Yieh-Ping; and Folkers, Karl. Synthetic analogs having the activity of naturally occurring forms of coenzyme Q. 3,974,187, Cl. 260-396.00R.
Wanat, Robert R., to Teletype Corporation. Method and apparatus for positioning a web in a printer. 3,973,664, Cl. 197-187.000.
Wang, Chen-Shen, to Standard Oil Company (Indiana). Branched nitropolyphenylenes and compositions therefrom. 3,974,121, Cl. 260-37.00R.
Ward, Bennie R.; and Geisler, Donald R., to Reynolds Metals Company. Non-detachable tab stock. 3,973,921, Cl. 29-197.500.
Warnant, Julien; and Jolly, Jean, to Roussel-UCLAF. Intermediates for the preparation of trienic steroids. 3,974,182, Cl. 260-340.900.
Warren, George D.: *See—*
Teer, Glenn Edward; Higgins, Jerry Gene; and Warren, George D., 3,974,119.
Warshavsky, Abraham: *See—*
Patchornik, Abraham; Kalir, Rami; Fridkin, Matityahu; and Warshavsky, Abraham, 3,974,110.
Warsop, Colin: *See—*
Trueman, Roy; Warsop, Colin; Godfrey, Graham; and Prestidge, John Malcolm, 3,974,341.
Wat, Edward Koon Wah, to Du Pont de Nemours, E. I., and Company. Substituted-3-phenyl ureas. 3,973,946, Cl. 71-92.000.
Watanabe, Hiroshi: *See—*
Shomura, Takashi; Watanabe, Hiroshi; Ogawa, Yasuaki; Ohba, Kazunori; Kondo, Yasumitsu; Kojima, Michio; Inoje, Shigeharu; and Niida, Taro, 3,974,035.
Watanabe, Osamu: *See—*
Ohkawa, Kiyoto; Watanabe, Osamu; and Nakamura, Yoshiteru, 3,974,497.
Yamazaki, Eizo; and Watanabe, Osamu, 3,974,494.
Watanabe, Sadakazu; Shinoda, Hidenori; and Imasato, Yuichi, to Tokyo Shibaura Electric Co., Ltd. Apparatus for discriminating the type of white blood corpusles and for counting the number thereof. 3,973,725, Cl. 235-92.0PC.
Watanabe, Tadashi: *See—*
Iwase, Seigo; Isozaki, Osamu; Iwasawa, Naozumi; and Watanabe, Tadashi, 3,974,303.
Watanabe, Teruji; Ishihara, Hideo; and Seki, Norio, to Kokusai Denshin Denwa Kabushiki Kaisha. Magnetic bubble transmission system. 3,974,487, Cl. 340-174.0TF.
Water Services of America, Inc.: *See—*
Cleaver, John C.; Leitner, Gordon F.; and Wiegratz, Fred G., 3,973,592.
Watson, Waldon O.: *See—*
Stumpf, Richard J.; Watson, Waldon O.; and Leonard, Robert J., 3,973,839.
Webb, David A.: *See—*
Greco, Nicholas P.; and Webb, David A., 3,973,971.
Weber, Heinrich: *See—*
Streck, Roland; and Weber, Heinrich, 3,974,092.
Streck, Roland; and Weber, Heinrich, 3,974,094.
Weber, Horst: *See—*
Lindner, Ulrich; Speichert, Hugo; Stritzke, Walter; Kilian, Werner; Bagowski, Dieter; and Weber, Horst, 3,973,894.
Weber, Otto; Hartwig, Horst; and Munchenberg, Gunter, to Volkswagenwerk Aktiengesellschaft. Disc brake. 3,973,653, Cl. 188-218.00A.
Wehde, Heinz, to Teldix GmbH. Electrical machine. 3,974,406, Cl. 310-67.00R.
Wehinger, Egbert: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 3,974,278.
Weinshenker, Ned M.: *See—*
Crosby, Guy A.; Dubois, Grant E.; and Weinshenker, Ned M., 3,974,299.
Weir, Niall Galbraith, to Glaxo Laboratories Limited. 3-Ethyl- and 3-(2'cyanoethyl)-cephalosporins. 3,974,152, Cl. 260-243.00C.
Weisang, Joseph Edouard; and Engelhard, Philippe, to Compagnie Francaise de Raffinage. Catalysts for the hydro-treatment of hydrocarbons and process of preparing such catalysts. 3,974,097, Cl. 252-440.000.
Weiss, Eckhard, to Daimler-Benz Aktiengesellschaft. Engine cylinder block and head connection. 3,973,547, Cl. 123-193.0CH.
Weisser, German Louis, to Fairchild Industries Inc. Suction valve for submerged pumping system. 3,973,868, Cl. 415-157.000.
Wella AG: *See—*
Husemeyer, Hans; and Konrad, Eugene, 3,973,900.
Weller, Kenneth P., to Hughes Aircraft Company. Millimeter waveguide oscillator and amplifier structure. 3,974,459, Cl. 331-96.000.
Wenninger, Freddie W.: *See—*
Miller, Leo S.; and Wenninger, Freddie W., 3,974,523.
Wenzel, Kurt, to Angenendt Verpackungssysteme GmbH. Cardan frame with two swivel joints. 3,973,790, Cl. 285-61.000.
Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Zellweger, Jurg, 3,973,467.
Wermers, Vilas L.: *See—*
Harjes, Clarence F.; and Wermers, Vilas L., 3,974,033.
Wessel, Wolf; Schwammle, Rudolf; Schnurle, Hans; and Knapp, Heinrich, to Robert Bosch G.m.b.H. Reducing noxious components from the exhaust gases of internal combustion engines. 3,973,529, Cl. 123-32.0EA.
Westerman, Lowell: *See—*
Lundberg, Robert D.; Phillips, Robert R.; Westerman, Lowell; and Bock, Jan, 3,974,241.
Western Electric Company, Inc.: *See—*
Lesyk, Joseph N.; Ludwig, David P.; and Monahan, Jack J., 3,973,714.
Westervelt, Dean C.: *See—*
Croop, Edward J.; Saunders, Howard E.; and Westervelt, Dean C., 3,974,302.
Westinghouse Electric Corporation: *See—*
Brand, Lawrence W.; Barbieri, Thomas; and McCalmont, David, 3,973,675.
Croop, Edward J.; Saunders, Howard E.; and Westervelt, Dean C., 3,974,302.
Desai, Kirit J., 3,973,870.
Hummert, George T.; Moser, Thomas D.; Edison, David M.; and Kurland, Marvin, 3,973,648.
Lugosi, Robert, 3,973,428.
Naley, Lowell B.; Haberkorn, Robert W.; and Leinum, Virgil D., 3,973,618.
Parker, Bruce W.; Morrison, Jim H.; and Noble, Arliss B., 3,973,503.
Reed, Terry J.; and Smith, Jack R., 3,973,391.
Sassano, Daniel R.; and Edelman, Leonard E., 3,974,113.
Silvestri, George J., Jr., 3,973,402.
Smith, James D. B.; and Phillips, David C., 3,973,438.
Smith, James D. B.; and Phillips, David C., 3,973,439.
Van Broekhoven, Jacob, 3,974,305.
Weyn, Hendrik Frans, to Colgate-Palmolive Company. Bleaching compositions. 3,974,082, Cl. 252-95.000.
Wheeler, John A., to United States of America, Energy Research and Development Administration. Reactor and method of operation. 3,974,028, Cl. 176-50.000.
Wheeler, Virgil C.; and Sharrett, Harry D., to Seaboard Oil & Gas Co. Wash-out tool and method of use thereof. 3,973,630, Cl. 166-312.000.
Wheeler, William R., to Varian Associates. High vacuum gate valve. 3,973,753, Cl. 251-204.000.
Wheelock, Kenneth S.; and Aldridge, Clyde L., to Exxon Research and Engineering Company. Sulfide removal process. 3,974,256, Cl. 423-230.000.
Whewell, Robert: *See—*
Spencer, John; Ruepp, Ferdinand; and Whewell, Robert, 3,973,359.
Whitaker, Ronald O. Combined display and range selector for use with digital instruments employing the binary numbering system. 3,974,444, Cl. 324-115.000.
White, Brian Graham: *See—*
Barlow, Charles Brian; White, Brian Graham; and Tomlin, Clive Dudley Spencer, 3,974,276.
White Chemical Corporation: *See—*
Mischutin, Vladimir, 3,974,310.
White, David B., to La-Z-Boy Chair Company. Deflectable chair back. 3,973,798, Cl. 297-296.000.
White, David R., to Upjohn Company, The. Cyanolpoxy intermediates for prostaglandins and process for preparing same. 3,974,146, Cl. 260-240.00R.
White, John David: *See—*
Datta, Vijay Jang; and White, John David, 3,973,998.
White, Joseph F., to Microwave Associates, Inc. Microwave device assemblies. 3,974,465, Cl. 333-31.00R.
White-Westinghouse Corporation: *See—*
Putman, Thomas H.; and Thompson, Francis T., 3,973,410.
Whiteley, Isaac C. Floor-ceiling air circulating device. 3,973,479, Cl. 98-33.00A.
Whiteman Manufacturing Company: *See—*
Whiteman, Marvin E., Jr., 3,973,857.

Whiteman, Marvin E., Jr., to Whiteman Manufacturing Company. Guard ring mounting for cement finisher apparatus. 3,973,857, Cl. 404-112.000.

Wick, Alexander Eduard: *See—*
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, 3,974,185.

Wiedemann, Wolfgang: *See—*
Rochlitz, Jurgen; and Wiedemann, Wolfgang, 3,973,959.

Wiegratz, Fred G.: *See—*
Cleaver, John C.; Leitner, Gordon F.; and Wiegratz, Fred G., 3,973,592.

Wiersema, Ype; and Ricke, Ross Dale, to Procter & Gamble Company, The. Fabric softener. 3,974,076, Cl. 252-8.800.

Wiese, Joseph A., Jr.: *See—*
Tiers, George V. D.; and Wiese, Joseph A., Jr., 3,974,147.

Wiig, Chester M., to F. J. Littell Machine Company. Belt drive system for high speed straightening machines. 3,973,423, Cl. 72-165.000.

Wildt Mellor Bromley Limited: *See—*
Farmer, Ernest Leonard, 3,973,415.

Williams, Malcolm; Brunt, Geoffrey Albert Kenyon; Jones, Christopher Robin; and Adey, Anthony John, to C.A.V. Limited. Fuel supply systems for internal combustion engines. 3,973,537, Cl. 123-139.00E.

Williams, Malcolm; Jones, Christopher Robin; and Crookes, Richard William, to C.A.V. Limited. Fuel systems for engines. 3,973,538, Cl. 123-139.00E.

Williams, Malcolm: *See—*
Jones, Christopher Robin; Williams, Malcolm; and Brunt, Geoffrey Albert Kenyon, 3,973,539.

Williams, Thomas A. Artificial logs and log-making method and apparatus. 3,973,922, Cl. 44-13.000.

Williams, Winfried Wilbur, Sr.; and Clancy, David, to Colgate-Palmolive Company. Automatic packaging method and apparatus. 3,973,373, Cl. 53-120.000.

Willis, Michael John: *See—*
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 3,974,300.

Willmann, Erich; and Trischler, Gunter, to Simplex Time Recorder Company. Flexitime recorder. 3,974,362, Cl. 235-92.00T.

Wilmer, Michael E., to Xerox Corporation. Interpolator for facsimile bandwidth compression. 3,974,325, Cl. 178-6.000.

Wilson, David, to Clutsom-Penn International Limited. Fabric treatment. 3,973,905, Cl. 8-130.100.

Wilson, James Royston: *See—*
Emson, Stephen Derek; Norton, Christopher Stephen; and Wilson, James Royston, 3,974,026.

Wilson Jones Company: *See—*
DeMand, John, 3,973,515.

Wilson, Lois E., to Corning Glass Works. Making spinel and aluminum-base metal cermet. 3,973,977, Cl. 106-62.000.

Wilwerding, Dennis J.: *See—*
Adams, James R., Jr.; and Wilwerding, Dennis J., 3,974,419.

Winchell, Frank J., to General Motors Corporation. Rotary combustion engine apex seal arrangement. 3,973,882, Cl. 418-121.000.

Winkler, Friedrich: *See—*
Gehlert, Rolf; and Winkler, Friedrich, 3,973,841.

Winkler, Hans-Werner, to Siemens Aktiengesellschaft. X-ray diagnostic apparatus for radioscopy and X-ray film exposures including an X-ray tube having a rotating anode. 3,974,384, Cl. 250-401.000.

Winters, Terry L., to Kimberly-Clark Corporation. Method for treating a disposable surgical drape. 3,974,308, Cl. 427-244.000.

Wisconsin Alumni Research Foundation: *See—*
Mistretta, Charles A.; and Kelcz, Frederick, 3,974,386.

Witt, Donald R., to Phillips Petroleum Company. Olefin polymerization catalyst. 3,974,101, Cl. 252-458.000.

Witte, Juergen, to Siemens Aktiengesellschaft. Process for operating a charge shift store. 3,974,485, Cl. 340-173.0DR.

Witzel, Frank, to Life Savers, Inc. Non-adhesive chewing gum composition. 3,974,293, Cl. 426-4.000.

Witzmann, Carl F.: *See—*
Nadler, Donald; and Witzmann, Carl F., 3,974,112.

Woditsch, Peter; Hill, Kurt; Hund, Franz; and Rodi, Fritz, to Bayer Aktiengesellschaft. Production of gamma iron oxide. 3,974,079, Cl. 252-62.560.

Woerner, Hans, to Pronton-Werk Alfred Gauthier GmbH. Magazine for slides for the simultaneous projection of pictures and reproduction of sound. 3,973,842, Cl. 353-19.000.

Wohrer, Luis C.: *See—*
Cottis, Steve G.; Economy, James; Storm, Roger S.; and Wohrer, Luis C., 3,974,250.

Wojciechowski, Jerzy: *See—*
Szelejewski, Wieslaw; Grzywa, Edward; Wojciechowski, Jerzy; Fraczek, Kazimerz; Maciejewski, Zdzislaw; and Kot, Boleslaw, 3,974,207.

Wolsi, Karl-Heinz: *See—*
Becker, Klaus; Wolsi, Karl-Heinz; and Purath, Bernd, 3,973,785.

Woltersdorf, Otto W., Jr.: *See—*
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,974,212.

Wood, William: *See—*
Puskas, Joseph Emil; Shibe, William J., Jr.; and Wood, William, 3,974,131.

Woodall Industries Inc.: *See—*
Pelham, Owen H., Sr., 3,974,124.

Woodrow, Harold E., to Morgan Construction Company. Axial preloading device for axially adjustable grooved work rolls. 3,973,425, Cl. 72-247.000.

Woodstream Corporation: *See—*
Souza, Anthony J.; and Robertson, J. Hibbard, 3,973,352.

Worrell, G. Richard; Hirsig, Alan R.; and Grane, Henry R., to Atlantic Richfield Company. Isophthalic acid manufacture. 3,974,214, Cl. 260-524.00R.

Wortmann, Joachim; Dany, Franz-Josef; Prell, Hedwig; and Kandler, Joachim, to Hoechst Aktiengesellschaft. Desensitized free-flowing red phosphorus. 3,974,260, Cl. 423-265.000.

Woulbroun, John M.: *See—*
Francel, Josef; King, James E.; and Woulbroun, John M., 3,973,975.

Wuest, Hans: *See—*
Buchi, George H.; and Wuest, Hans, 3,974,225.

Wurmli, Arthur, to Rieter Machine Works, Ltd. Oil supply apparatus for ring spinning machines and ring twisting machines. 3,973,647, Cl. 184-7.00A.

Xerox Corporation: *See—*
Bean, Lloyd F., 3,973,954.
Bean, Lloyd F., 3,973,958.
Cook, John H., 3,973,699.
Cross, Thomas R.; and George, Clifford L., 3,973,769.
Crystal, Richard G., 3,974,078.
Flannery, John B.; and Van Laeken, Anita C., 3,973,966.
Hudson, Frederick W., 3,973,517.
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 3,973,843.
Lindblad, Nero R.; Till, Henry R.; and Beatty, Charles L., 3,973,845.
Malinich, Richard M., 3,974,363.
McCarroll, Alan F., 3,973,844.
Montgomery, Anthony J., 3,973,953.
Montgomery, Anthony J., 3,973,957.
Starkweather, Gary Keith, 3,973,825.
Starkweather, Gary Keith, 3,974,506.
Sullivan, William A.; Cassano, James R.; and Kingsland, David O., 3,973,846.
Volkers, Stewart W.; and Thon, Robert H., 3,973,518.
Wilmer, Michael E., 3,974,325.

Yablonski, Robert E., to Electronic Engineering Company of California. Stepping motor signal circuit. 3,974,434, Cl. 318-696.000.

Yagi Antenna Co., Ltd.: *See—*
Oyama, Satoshi; and Takahashi, Akira, 3,974,399.

Yaguchi, Katsumi: *See—*
Okumura, Osamu; Yaguchi, Katsumi; Adachi, Ikuo; and Nagayama, Masuzo, 3,974,211.

Yale, Ramon L.: *See—*
Ferri, John L.; Mathers, James E.; and Yale, Ramon L., 3,974,389.

Yamada, Hideaki; Kumagai, Hidehiko; and Ohkishi, Haruyiki, to Mitsubishi Chemical Industries Ltd. Process for producing L-cysteine or its derivatives. 3,974,031, Cl. 195-29.000.

Yamada, Makoto: *See—*
Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, 3,973,361.

Yamada, Sigemitu, to Hitachi, Ltd. Injection molding apparatus having permanent mold conveying path. 3,973,891, Cl. 425-246.000.

Yamada, Tetsuo: *See—*
Fujita, Tatsu; Kawakami, Heijiro; Yamada, Yoshiro; and Yamada, Tetsuo, 3,973,426.

Yamada, Yoshiro: *See—*
Fujita, Tatsu; Kawakami, Heijiro; Yamada, Yoshiro; and Yamada, Tetsuo, 3,973,426.

Yamaguti, Masanobu: *See—*
Nakayama, Masatoki; Nakasugi, Hajime; Tamehiro, Hiroshi; Kimura, Turugi; and Yamaguti, Masanobu, 3,973,999.

Yamamoto, Hisao: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 3,974,145.

Yamano, Kiyoichi: *See—*
Itoh, Tetsuro; Takahashi, Tetsuo; and Yamano, Kiyoichi, 3,973,950.

Yamano, Masaru; Ikeda, Hironosuke; Takahara, Ichiro; Kudo, Toshiyuki; Ito, Kazuo; and Yamada, Makoto, to Sanyo Electric Co., Ltd. Stylus grinding device for video disc player. 3,973,361, Cl. 51-241.00R.

Yamanoi, Akio: *See—*
Kobayashi, Tadao; Yamanoi, Akio; and Otsuka, Shin-Ichiro, 3,974,030.

Yamashiro, Yoshiharu: *See—*
Abe, Kiyomi; Shishido, Yoshio; Tagata, Genichi; Sugino, Tadaaki; and Yamashiro, Yoshiharu, 3,974,332.

Yamazaki, Eizo; and Watanabe, Osamu, to Mitsubishi Denki Kabushiki Kaisha. Character display apparatus for providing a viewing frame for a data input area. 3,974,494, Cl. 340-324.0AD.

Yamazaki, Noboru; and Higashi, Fukuji, to Sumitomo Chemical Company, Limited. Phosphonium salt and its use. 3,974,219, Cl. 260-562.00R.

Yamazoe, Yoshinori: *See—*
Tanigawa, Shizuhiko; Yamazoe, Yoshinori; and Nakamura, Chihiro, 3,974,017.

Yanagihara, Kazuhiko; and Takeda, Hideo, to Fuji Photo Film Co., Ltd. System for metering liquid. 3,973,437, Cl. 73-219.000.

Yanek, Edward J.: *See—*
Eyster, Paul J.; and Yanek, Edward J., 3,973,876.

Yano, Tsuyoshi; Ichikawa, Kazumasa; Take, Takao; and Sasano, Tetsuro, to Onoda Cement Company, Ltd. Process for producing board of cement-like material reinforced by glass fiber. 3,974,024, Cl. 162-101.000.
Yardley, Alfred: *See—*
Reynolds, Desmond Henry James; and Yardley, Alfred, 3,973,401.
Yeda Research & Development Co. Ltd.: *See—*
Patchornik, Abraham; Kalir, Rami; Fridkin, Matityahu; and Warshavsky, Abraham, 3,974,110.
Ygfors, Goran. Contact carriers for relays. 3,974,468, Cl. 335-151.000.
Yokogawa Electric Works, Ltd.: *See—*
Ueda, Toshitsugu; and Takeuchi, Shiro, 3,974,425.
Yoshida Kogyo Kabushiki Kaisha: *See—*
Douri, Hisashi; and Oosaki, Tatsuo, 3,973,312.
Takamatsu, Ikuo; and Yoshida Kogyo Kabushiki Kaisha, 3,973,300.
Yoshida, Masateru; and Natori, Minoru, to Citizen Watch Co., Ltd. Liquid crystal display cell. 3,973,388, Cl. 58-50.00R.
Yoshida, Tadao: *See—*
Kamimura, Kazuhiko; and Yoshida, Tadao, 3,974,455.
Yoshimura, Takuji: *See—*
Ohtomo, Koichiro; and Yoshimura, Takuji, 3,973,974.
Yoshitomi Pharmaceutical Industries, Ltd.: *See—*
Nakanishi, Michio; Oe, Takanori; and Tsuruda, Mineo, 3,974,168.
Young, Edwin Harry Paterson, to Imperial Chemical Industries Limited. 2-(Substituted anilino) methylmorpholine compounds. 3,974,156, Cl. 260-247.10R.
Young, Edwin Harry Paterson, to Imperial Chemical Industries Limited. 2-(Substituted anilino)methylmorpholines. 3,974,158, Cl. 260-247.50R.
Young, Francis M. Lapping device. 3,973,358, Cl. 51-26.000.
Young, Michael Anthony Richard: *See—*
Stalley, Anthony Donald; and Young, Michael Anthony Richard, 3,973,817.
Youngdale, Gilbert A., to Upjohn Company, The. 2a,2b-Dihomo-15-alkyl-PGF_2 analogs. 3,974,195, Cl. 260-410.90R.
Yu, Jing-Peir, to Monsanto Company. Friction falsetwist device. 3,973,383, Cl. 57-77.400.
Yu, Jing-peir, to Monsanto Company. Friction aggregate. 3,973,384, Cl. 57-77.400.
Yulkowski, Leon B. Door hinge. 3,973,289, Cl. 16-178.000.
Yuminaka, Takeo: *See—*
Iwasaka, Tatsuo; Yuminaka, Takeo; Kaneko, Takashi; and Kinoshita, Hiroshi, 3,973,649.
Zacharias, Ellis M., Jr.: *See—*
Cirulis, Uldis; and Zacharias, Ellis M., Jr., 3,973,430.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,973,608.
Umezawa, Hamao; Takeuchi, Tomio; Chimura, Hideo; Sawa, Tsutomu; and Hamada, Masa, 3,974,184.
Zapolsky, Ira M. Lamp fixture. 3,974,373, Cl. 240-128.000.
Zdanavichjus, Ionas Iona: *See—*
Noreika, Rimas-Kazimeras Mechislovo; Musnitskas, Juozas-Romanas Juozo; Lesene, Iolanta Vladimiro; and Zdanavichjus, Ionas Iona, 3,974,139.
Zelders, Wim, to Van Doorne's Bedrijfswagenfabriek Daf B.V. Device for feeding fuel to a diesel engine. 3,973,536, Cl. 123-136.000.
Zellweger, Jurg, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Cartridge infeed apparatus for an automatic firing weapon. 3,973,467, Cl. 89-33.00C.
Zenith Radio Corporation: *See—*
Lange, Howard G., 3,973,964.
Zenzefilis, George E. Transmission of video pictures at audio frequencies. 3,974,329, Cl. 178-6.800.
Zephinie, Gerard, to Societe Soberal S.A. Rescue apparatus. 3,973,644, Cl. 182-47.000.
Zetterberg, Niklas F.: *See—*
McKinnon, Eugene T.; Drutz, Alvin S.; Danta, Randall C.; and Zetterberg, Niklas F., 3,973,584.
Ziemek, Gerhard: *See—*
Albes, Friedrich; Kleemann, Werner; and Ziemek, Gerhard, 3,973,424.
Zimmermann, Hans; Thumm, Heinrich; and Roth, Kurt, to Hoechst Aktiengesellschaft. Process and device for the continuous fixation of prints and pad-dyeings on polyester fibers and their mixtures with cellulose fibers. 3,973,902, Cl. 8-21.00C.
Zink, John S.: *See—*
Reed, Robert D.; and Zink, John S., 3,973,899.
Zirinsky, Stanley; Irene, Eugene A.; and Silvestri, Victor J., to IBM. Chemical vapor deposition of dielectric films containing Al, N, and Si. 3,974,003, Cl. 148-187.000.
Ziv, David Moiscevich, deceased: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.
Ziv, Valentina Spiridonovna, administratrix: *See—*
Drabkina, Lidia Emelianovna; Mazurek, Jury Vatslavovich; Myascedov, Dmitry Nikolaevich; Prokhorov, Viktor Pavlovich; Kachalov, Vladimir Alexandrovich; and Ziv, David Moiscevich, deceased, 3,974,322.
Zuev, Anatoly Vasilievich: *See—*
Seleznev, Konstantin Pavlovich; Galerkin, Jury Borisovich; Strizhak, Leonid Yakovlevich; and Zuev, Anatoly Vasilievich, 3,973,872.
Zumbro, David J., to Merco Products, Inc. Suspended fixture assembly. 3,973,656, Cl. 191-12.00R.
Zygo Corporation: *See—*
Lawson, John A., 3,973,833.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF AUGUST, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Baxter, Meriwether L., Jr., to Gleason Works, The. Gear tooth design. Re. 28,926, Cl. 74-462.000.

Gleason Works, The: *See—*
Baxter, Meriwether L., Jr., Re. 28,926.

Hart, Cornelis Maria, to U.S. Philips Corporation. Integrated circuit comprising supply polarity independent current injector. Re. 28,928, Cl. 307-304.000.

Jorden, James R., Jr.; and Mitchell, Forrest R., to Shell Oil Company. Neutron method for determining residual oil-phase fluid concentration. Re. 28,925, Cl. 73-152.000.

Karper, Albert. Rotary card file. Re. 28,927, Cl. 312-186.000.

Krueger, Harvey R.: *See—*
Neumann, Charles G.; Krueger, Harvey R.; and Panock, Walter, Re. 28,924.

Mitchell, Forrest R.: *See—*
Jorden, James R., Jr.; and Mitchell, Forrest R., Re. 28,925.

Neumann, Charles G.; Krueger, Harvey R.; and Panock, Walter, to Reynolds Products Inc. Plate type ice maker. Re. 28,924, Cl. 62-320.000.

Panock, Walter: *See—*
Neumann, Charles G.; Krueger, Harvey R.; and Panock, Walter, Re. 28,924.

Reynolds Products Inc.: *See—*
Neumann, Charles G.; Krueger, Harvey R.; and Panock, Walter, Re. 28,924.

Shell Oil Company: *See—*
Jorden, James R., Jr.; and Mitchell, Forrest R., Re. 28,925.

U.S. Philips Corporation: *See—*
Hart, Cornelis Maria, Re. 28,928.

LIST OF PLANT PATENTEES

Whitting, Hubert F. Paspalum vaginatum grass plant. 3,939, 8–10–76, Cl. 88.

LIST OF DESIGN PATENTEES

AB Volvo: *See—*
Wilsgaard, Jan E. 240,914.

AMP Inc.: *See—*
Harkins, Guy V. 240,934.
Lemke, Timothy A. 240,933.

Adams, Richard C.: *See—*
St. Cyr, Robert D., Such, and Adams. 240,951.

Adonsell Ltd.: *See—*
Hurst, Arthur. 240,968.

Amerock Corp.: *See—*
Tegner, Raymond U. H. 240,875.

Anchor Hocking Corp.: *See—*
Benes, Frank J. 240,884.
Benes, Frank J. 240,885.

Banas, Andrew J., Sr. Tape measure case. 240,903, 8–10–76, Cl. D10—72.

Benes, Frank J., to Anchor Hocking Corp. Dish or similar article. 240,884, 8–10–76, Cl. D7—20.

Benes, Frank J., to Anchor Hocking Corp. Bowl or similar article. 240,885, 8–10–76, Cl. D7—28.

Benkoe, Erwin: *See—*
Goldfarb, Adolph E., Benkoe, Everitt, Chesley, and Frierdich. 240,954.

Bennett, Byron C. Combined clock face and hands. 240,906, 8–10–76, Cl. D10—125.

Bennett, Byron C. Combined clock face and hands. 240,907, 8–10–76, Cl. D20—125.

Birdsall, John D. Wall switch cover. 240,892, 8–10–76, Cl. D8—183.

Birdsall, John D. Wall switch cover. 240,893, 8–10–76, Cl. D8—183.

Birdsall, John D. Wall switch cover. 240,894, 8–10–76, Cl. D8—183.

Boeing Co., The: *See—*
Kristoffersen, Bjorn R. 240,930.
Whitener, Philip C. 240,909.

Box, Theodor. Automobile trouble flasher. 240,904, 8–10–76, Cl. D10—114.

Brisken, Edward: *See—*
Rogers, Gail, Spiedel, Brisken, and Rodgers. 240,900.

Bruner, William L., to F. B. Electronics. Signal light sign panel. 240,905, 8–10–76, Cl. D10—114.

Burke, Frederick A., J. A. Farrell, and D. A. Long, to The Gillette Co. Flower pot base. 240,957, 8–10–76, Cl. D35—3.

Byrne, David S., to Warner-Lambert Co. Razor blade dispenser. 240,902, 8–10–76, Cl. D9—224.

Candilotis, Gerassimos C., to Uniroyal, Inc. Pneumatic tire tread and buttress. 240,912, 8–10–76, Cl. D12—147.

Casey, Juanita A., and K. L. Johnson. Hippopotamus puppet. 240,939, 8–10–76, Cl. D34—2.

Casey, Juanita A., and K. L. Johnson. Serpent puppet. 240,940, 8–10–76, Cl. D34—2.

Casey, Juanita A., and K. L. Johnson. Elephant puppet. 240,941, 8–10–76, Cl. D34—2.

Casey, Juanita A., and K. L. Johnson. Man puppet. 240,944, Cl. D34—4.

Chabot, Jean-Marie: *See—*
Metivier, Clement, and Chabot. 240,928.

Chesley, Ronald F.: *See—*
Goldfarb, Adolph E., Benkoe, Everitt, Chesley, and Frierdich. 240,954.

Clausen, Ib C.: *See—*
Simonsen, Ole, Clausen, and Jensen. 240,953.

Coffman, Donald D. Camper unit for pickup trucks. 240,913, 8–10–76, Cl. D12—156.

Continental Equipment Corp.: *See—*
Holmes, Dale F. 240,956.

Creaco A/S: *See—*
Simonsen, Ole, Clausen, and Jensen. 240,953.

Daenen, Robert H. C., to Dart Industries Inc. Cruet. 240,887, 8–10–76, Cl. D7—59.

Dart Industries Inc.: *See—*
Daenen, Robert H. C. 240,887.

Davidson, Charles P. D., to Joseph Lucas Ltd. Bicycle frame. 240,910, 8–10–76, Cl. D12—111.

Dykes, Lee O., Jr., and L. H. Game board. 240,950, 8–10–76, Cl. D34—5.55.

Dykes, Lillian H.: *See—*
Dykes, Lee O., Jr., and L. H. 240,950.

Elsen, Leonard. Spindle back chair. 240,872, 8–10–76, Cl. D6—74.

Ethyl Development Corp.: *See—*
McDonald, John W. 240,897.

Everitt, Delmer K.: *See—*
Goldfarb, Adolph E., Benkoe, Everitt, Chesley, and Frierdich. 240,954.

F. B. Electronics: *See—*
Bruner, William L. 240,905.

Faber, B. V.: *See—*
Faber, Gerrit J. 240,931.

Faber, Gerrit J., to B. V. Faber. Heating stove. 240,931, 8–10–76, Cl. D23—105.

Fahnstrom, Dale E., and R. D. Peterson, to The Gillette Co. Portable hair dryer. 240,969, 8–10–76, Cl. D86—10.

Farrell, Joel A.: *See—*
Burke, Frederick A., Farrell, and Long. 240,957.

Ferriter, Roger G.: *See—*
Howard, Fred, and Ferriter. 240,870.

Frierdich, Richard D.: *See—*
Goldfarb, Adolph E., Benkoe, Everitt, Chesley, and Frierdich. 240,954.

Funahashi, Takaji. Rotary stamp. 240,966, 8–10–76, Cl. D64—10.

Gardner, Russell G. Holder for pool and billiard cues. 240,942, 8–10–76, Cl. D24—3.

Gemco-Ware Inc.: *See—*
Jay, Murray. 240,886.

General Electric Co.: *See—*
Melvin, Charles A. 240,964.

Gillette Co., The: *See—*
Burke, Frederick A., Farrell, and Long. 240,957.
Fahnstrom, Dale E., and Peterson. 240,969.

Goldfarb, Adolph E., E. Benkoe, D. K. Everitt, R. F. Chesley, and R. D. Frierdich; said Everitt, Chesley, and Frierdich assignors to said Goldfarb and Benkoe. Doll house. 240,954, 8–10–76, Cl. D34—15.

Goss, Daniel G.: *See*—
Lewis, Robert D., and Goss. 240,873.
Grace, W. R., & Co.: *See*—
Vachon, Roy R. 240,911.
Green, Robert F., to Johns-Manville Corp. Building member to be used for moldings, columns or the like. 240,915, 8–10–76, Cl. D25—74.
Guodace, Ronald A., to International Silver Co. Article of flatware. 240,889, 8–10–76, Cl. D7—137.
Hanes Corp.: *See*—
Howard, Fred, and Ferriter. 240,870.
Harkins, Guy V., to AMP Inc. Modular self-commoning barrier block. 240,934, 8–10–76, Cl. D26—1.
Herman, Robert. Stool or similar article. 240,871, 8–10–76, Cl. D6—32.
Hermann, Thomas L.: *See*—
King, William L., and Hermann. 240,935.
Hi-Ran, Ltd.: *See*—
Sturgill, James R. 240,923.
Sturgill, James R. 240,925.
Sturgill, James R. 240,926.
Sturgill, James R. 240,927.
Holcomb, Jack N., to National Intelligence Academy. Voltage educational board. 240,916, 8–10–76, Cl. D19—64.
Holcomb, Jack N., to National Intelligence Academy. Radio frequency propagation educational board. 240,917, 8–10–76, Cl. D19—64.
Holmes, Dale F., to Continental Equipment Corp. Planter. 240,956, 8–10–76, Cl. D35—3.
Hotchkiss, Thomas W. Window decal. 240,960, 8–10–76, Cl. D59—2.
Hotchkiss, Thomas W. Window decal. 240,961, 8–10–76, Cl. D59—2.
Howard, Fred, and R. G. Ferriter, to Hanes Corp. Display stand. 240,870, 8–10–76, Cl. D6—24.
Hurst, Arthur, to Adonsell Ltd. Infants feeding bottle. 240,968, 8–10–76, Cl. D83—8.
Hutcheson, Claude H., Jr., and L. H. Warren, to Xerox Corp. Coin operated reproduction machine. 240,965, 8–10–76, Cl. D16—30.
Imai, Shogo, to Sharp Kabushiki Kaisha (Sharp Corp). Radio. 240,959, 8–10–76, Cl. D56—4.
International Silver Co.: *See*—
Giuodace, Ronald A. 240,889.
Jay, Murray, to Gemco-Ware Inc. Combined juice extractor and storage container. 240,886, 8–10–76, Cl. D7—49.
Jensen, Johannes: *See*—
Simonsen, Ole, Clausen, and Jensen. 240,953.
Johns-Manville Corp.: *See*—
Green, Robert F. 240,915.
Johnson, Kathleen L.: *See*—
Casey, Juanita A., and Johnson. 240,939.
Casey, Juanita A., and Johnson. 240,940.
Casey, Juanita A., and Johnson. 240,941.
Casey, Juanita A., and Johnson. 240,944.
Jones, Alonzo L. Golf club head for putting and chipping. 240,949, 8–10–76, Cl. D34—5.
Kahler, Richard W. Smoking pipe or the like. 240,938, 8–10–76, Cl. D27—3.
Kamoshida, Atsuko: *See*—
Yamaguchi, Seisho, Nezu, Kamoshida, and Shimizu. 240,919.
King, William L., and T. L. Hermann, to NCR Corp. Commercial teller terminal or similar article. 240,935, 8–10–76, Cl. D26—5.
Kline, David T. Furniture panel. 240,879, 8–10–76, Cl. D6—192.
Knight, Annette E. Cover for a domestic appliance. 240,882, 8–10–76, Cl. D6—269.
Kremski, Jacob. Ball rack carrier for pool tables. 240,943, 8–10–76, Cl. D34—3.
Kristoffersen, Bjorn R., to The Boeing Co. Water closet. 240,930, 8–10–76, Cl. D23—67.
Lamb, Thomas. Chair. 240,874, 8–10–76, Cl. D6—78.
Learing, James F. Rack for sewing accessories or the like. 240,876, 8–10–76, Cl. D6—114.
Lefkof, Lawrence M. Tie rack. 240,877, 8–10–76, Cl. D6—117.
Lemke, Timothy A., to AMP Inc. Open barrel aluminum cable connector. 240,933, 8–10–76, Cl. D26—1.
Les Industries Provinciales Limitee: *See*—
Metivier, Clement, and Chabot. 240,928.
Lewis, Robert D., and D. G. Goss. Folding chair. 240,873, 8–10–76, Cl. D6—76.
Livesay, James R., to Wolverine Toy Co. Bowling game cabinet. 240,946, 8–10–76, Cl. D34—5.
Loflin, William H. Tool for removing spin-on oil filters. 240,890, 8–10–76, Cl. D8—29.
Long, Douglas A.: *See*—
Burke, Frederick A., Farrell, and Long. 240,957.
Lucas, Joseph, Ltd.: *See*—
Davidson, Charles P. D. 240,910.
Matsumoto, Ikki, to The Procter & Gamble Co. Sheet of paper toweling. 240,962, 8–10–76, Cl. D59—2.
Matsumura, Katsuya, to Sharp Kabushiki Kaisha (Sharp Corp). Combined amplifier tuner and tape player. 240,937, 8–10–76, Cl. D26—14.
Maxwell, James D. Fish lure. 240,922, 8–10–76, Cl. D22—29.
McCarthy, Frank M.: *See*—
Werner, Richard L., McCarthy, and Runkel. 240,895.
McDonald, John W., to Ethyl Development Corp. Bottle or similar article. 240,897, 8–10–76, Cl. D9—87.
McIlroy, John C. Trap. 240,929, 8–10–76, Cl. D23—46.
Melvin, Charles A., to General Electric Co. Light meter. 240,964, 8–10–76, Cl. D16—39.
Metivier, Clement, and J-M. Chabot, to Les Industries Provinciales Limitee. Tree sap collecting spigot. 240,928, 8–10–76, Cl. D23—32.
NCR Corp.: *See*—
King, William L., and Hermann. 240,935.
National Intelligence Academy: *See*—
Holcomb, Jack N. 240,916.
Holcomb, Jack N. 240,917.
Nezu, Fujiro: *See*—
Yamaguchi, Seisho, Nezu, Kamoshida, and Shimizu. 240,919.
Niclaus, William L. Clothes hanger. 240,881, 8–10–76, Cl. D6—255.
Norton, Monte G. Dartboard. 240,945, 8–10–76, Cl. D34—5.
Nozdres, Victor P. Watch face. 240,908, 8–10–76, Cl. D10—126.
O'Brien, Jerry. Housing for an electro-mechanical transducer. 240,936, 8–10–76, Cl. D26—14.
Olivetti, Ing. C., & C., S.p.A.: *See*—
Sottsass, Ettore, Jr. 240,967.
Orensten, Vivan C. Cover for an aquarium filter. 240,924, 8–10–76, Cl. D23—4.
Owens-Illinois, Inc.: *See*—
Reynolds, Raymond G. 240,898.
Weckman, Richard L. 240,899.
Pester, K. Clark, to The Procter & Gamble Co. Sheet of paper Toweling. 240,963, 8–10–76, Cl. D59—2.
Peterson, Robert D.: *See*—
Fahnstrom, Dale E., and Peterson. 240,969.
Phillips, James C. Game table base. 240,880, 8–10–76, Cl. D6—194.
Pomper, William R. Golf club or similar article. 240,947, 8–10–76, Cl. D34—5.
Press, Fred, to Styson, Inc. Cheese server. 240,883, 8–10–76, Cl. D7—17.
Procter & Gamble Co., The: *See*—
Matsumoto, Ikki. 240,962.
Pester, K. Clark. 240,963.
Rempel, Dietrich G., to Rempel Enterprises, Inc. Fruit loading hopper for a harvesting machine. 240,958, 8–10–76, Cl. D40—1.
Rempel Enterprises, Inc.: *See*—
Rempel, Dietrich G. 240,958.
Redoutey, Joseph F. Golf club head. 240,948, 8–10–76, Cl. D34—5.
Reynolds, Raymond G., to Owens-Illinois, Inc. Bottle. 240,898, 8–10–76, Cl. D9—119.
Roche, John A., to Stevens Mfg. Co. Roller skate. 240,952, 8–10–76, Cl. D34—19.
Rock, Salvatore J. Pre-knoted necktie rack. 240,878, 8–10–76, Cl. D6—118.
Rodgers, Peter: *See*—
Rogers, Gail, Spiedel, Brisken, and Rodgers. 240,900.
Rogers, Gail, B. Spiedel, E. Brisken, and P. Rodgers. Packaging tray for food or the like. 240,900, 8–10–76, Cl. D9—187.
Roussel, Thomas S. Basket cooler. 240,888, 8–10–76, Cl. D7—77.
Runkel, Arthur W.: *See*—
Werner, Richard L., McCarthy, and Runkel. 240,895.
Russell, Charles R. Combined dental floss dispenser and applicator. 240,932, 8–10–76, Cl. D24—1.
St. Cyr, Robert D., J. O. Such, and R. C. Adams. Game board. 240,951, 8–10–76, Cl. D34—5.55.
Satten, Michael I. Toy tool box. 240,955, 8–10–76, Cl. D34—15.
Sharp Kabushiki Kaisha (Sharp Corp): *See*—
Imai, Shogo. 240,959.
Matsumura, Katsuya. 240,937.
Shimizu, Hidenori: *See*—
Yamaguchi, Seisho, Nezu, Kamoshida, and Shimizu. 240,919.
Simonsen, Ole, I. C. Clausen, and J. Jensen, to Creaco A/S Toy construction piece. 240,953, 8–10–76, Cl. D34—15.
Smithwick, Jack A. Fishing lure. 240,920, 8–10–76, Cl. D22—27.
Sottsass, Ettore, Jr., to Ing. C. Olivetti & C., S.p.A. Accounting machine. 240,967, 8–10–76, Cl. D64—11.
Spiedel, Billy: *See*—
Rogers, Gail, Spiedel, Brisken, and Rodgers. 240,900.
Steven Mfg. Co.: *See*—
Roche, John A. 240,952.
Sturgill, James R., to Hi-Ran, Ltd. Underdrain for water filtration system. 240,923, 8–10–76, Cl. D23—4.
Sturgill, James R., to Hi-Ran, Ltd. Underdrain for water filtration system. 240,925, 8–10–76, Cl. D23—4.
Sturgill, James R., to Hi-Ran, Ltd. Underdrain unit for water filtration system. 240,926, 8–10–76, Cl. D23—4.
Sturgill, James R., to Hi-Ran, Ltd. Underdrain unit for water filtration system. 240,927, 8–10–76, Cl. D23—4.
Styson, Inc.: *See*—
Press, Fred. 240,883.
Such, Jay O.: *See*—
St. Cyr, Robert D., Such, and Adams. 240,951.
Taylor, Van L. Fishing lure. 240,921, 8–10–76, Cl. D22—27.
Tegner, Raymond U. H., to Amerock Corp. Soap dish holder. 240,875, 8–10–76, Cl. D6—90.
Trengsberg, Nils J. Roll calendar casing for a watchband. 240,918, 8–10–76, Cl. D19—20.
Unger, Henry M. Combined display card and article holder. 240,901, 8–10–76, Cl. D9—191.
Uniroyal, Inc.: *See*—
Candiliotis, Gerassimos C. 240,912.
Vachon, Roy R., to W. R. Grace & Co. Air box for bicycles. 240,911, 8–10–76, Cl. D12—114.
Waddel, David R. Leather working tool arrangement. 240,891, 8–10–76, Cl. D8—98.
Ward, Donald L. Support bracket for a staircase tread. 240,896, 8–10–76, Cl. D8—235.
Warner-Lambert Co.: *See*—
Byrne, David S. 240,902.
Warren, Larry H.: *See*—
Hutcheson, Claude H., Jr., and Warren. 240,965.

Weckman, Richard L., to Owens-Illinois, Inc. Jar. 240,899, 8–10–76, Cl. D9—125.
Werner, Richard L., F. M. McCarthy, and A. W. Runkel. Pulley or similar article. 240,895, 8–10–76, Cl. D8—216.
Whitener, Philip C., to The Boeing Co. Airplane. 240,909, 8–10–76, Cl. D12—76.
Wilsgaard, Jan E., to AB Volvo. Automobile front fender. 240,914, 8–10–76, Cl. D12—184.
Wolverine Toy Co.: *See*— Livesey, James R. 240,946.
Xerox Corp.: *See*— Hutcheson, Claude H., Jr., and Warren. 240,965.
Yamaguchi, Seisho, F. Nexu, A. Kamoshida, and H. Shimizu. Drawing compass. 240,919, 8–10–76, Cl. D19—38.

CLASSIFICATION OF PATENTS

ISSUED AUGUST 10, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
2.5 3,973,275
215 3,973,276

CLASS 3
1 3,973,277
1.912 3,973,278

CLASS 4
159 3,973,279

CLASS 5
99B 3,973,280
131 3,973,281
370 3,973,282

CLASS 7
1E 3,973,283

CLASS 8
10.1 3,973,900
3,973,901
21C 3,973,902
92 3,973,903
94.24 3,973,904
130.1 3,973,905
149.3 3,973,906
172R 3,973,907
176 3,973,908

CLASS 12
146D 3,973,284
3,973,285

CLASS 15
21D 3,973,286
250.25 3,973,287

CLASS 16
146 3,973,288
178 3,973,289

CLASS 17
45 3,973,290

CLASS 19
148 3,973,291

CLASS 23
230PC 3,973,910
230B 3,973,912
3,973,913
230R 3,973,909
3,973,911
254E 3,973,914
259 3,973,915
277C 3,973,916
293R 3,973,917

CLASS 24
16PB 3,973,292
3,973,293
30.5T 3,973,294
73B 3,973,295
90T.A 3,973,296
122.6 3,973,297
146 3,973,298
150FP 3,973,299
205.15R 3,973,300
239 3,973,301
243AB 3,973,302

CLASS 26
18.6 3,973,303
81 3,973,305
3,973,306
84 3,973,304

CLASS 29
95R 3,973,307
3,973,308
96 3,973,309
156.4R 3,973,310
157.3D 3,973,918
163.5CW 3,973,311
193.5 3,973,919
194 3,973,920
197.5 3,973,921
207.5SL 3,973,312
208C 3,973,313
227 3,973,314
239 3,973,315
416 3,973,316
427 3,973,317
437 3,973,318
567 3,973,319
578 3,973,320
602R 3,973,321
626 3,973,322

CLASS 30
43.92 3,973,323
370 3,973,324

CLASS 33
27M 3,973,325
125R 3,973,326
169R 3,973,327

CLASS 34
4 3,973,328
9 3,973,329
55 3,973,330

CLASS 35
9R 3,973,331
22R 3,973,332
29R 3,973,333
35R 3,973,334
49 3,973,335

CLASS 36
3B 3,973,336
51 3,973,337
65 3,973,338

CLASS 37
58 3,973,575

CLASS 40
73.4 3,973,339
106.21 3,973,340
124.1 3,973,341
136 3,973,342
152.1 3,973,343
158B 3,973,344
309 3,973,345

CLASS 43
15 3,973,346
17 3,973,347
23 3,973,348
42.03 3,973,349
3,973,350
42.06 3,973,351
92 3,973,352

CLASS 44
13 3,973,922

CLASS 47
1.2 3,973,353
1.3 3,973,354
37 3,973,355
41R 3,973,356

CLASS 48
197R 3,973,923
202 3,973,924

CLASS 49
13 3,973,357

CLASS 51
26 3,973,358
75 3,973,359
101R 3,973,360
241R 3,973,361
295 3,973,925
386 3,973,362

CLASS 52
2 3,973,363
57 3,973,364
79 3,973,365
99 3,973,366
262 3,973,367
476 3,973,368
526 3,973,369
745 3,973,370
758H 3,973,371

CLASS 53
33 3,973,372
120 3,973,373
333 3,973,374
374 3,973,375
385 3,973,376

CLASS 55
3 3,973,926
4 3,973,927
16 3,973,928
17 3,973,929
41 3,973,930
58 3,973,931
132 3,973,932
139 3,973,933
158 3,973,934
302 3,973,935
363 3,973,936
449 3,973,937

CLASS 56
1 3,973,377
11.9 3,973,378
3,973,379
14.6 3,973,380

CLASS 57
58.83 3,973,381
58.89 3,973,382
77.4 3,973,383
3,973,384
144 3,973,385
157TS 3,973,386
157R 3,973,387

CLASS 58
50R 3,973,388

CLASS 59
35R 3,973,389

CLASS 60
39.06 3,973,390
39.29 3,973,391
39.48 3,973,392
39.63 3,973,393
3,973,394
39.65 3,973,395
39.66 3,973,396
253 3,973,397
427 3,973,398
445 3,973,399
465 3,973,400
548 3,973,401
678 3,973,402
688 3,973,403
693 3,973,404

CLASS 61
1F 3,973,406
1R 3,973,405
35 3,973,408
39 3,973,409

CLASS 62
3 3,973,938
237 3,973,939
320 Re.28,924
527 3,973,410

CLASS 64
4 3,973,411
28R 3,973,412

CLASS 65
65A 3,973,940
79 3,973,941
83 3,973,942
348 3,973,943

CLASS 66
1A 3,973,413
9B 3,973,414
50B 3,973,415
64 3,973,416

CLASS 68
19.1 3,973,417

CLASS 70
34 3,973,418
68 3,973,419
78 3,973,420
364R 3,973,421
431 3,973,422

CLASS 71
88 3,973,944
3,973,945
92 3,973,946
93 3,973,947

CLASS 72
165 3,973,423
177 3,973,424
247 3,973,425
286 3,973,426
448 3,973,427
467 3,973,428

CLASS 73
49.7 3,973,429
61.1R 3,973,430
76 3,973,431
81 3,973,432
104 3,973,433
139 3,973,434
143 3,973,435
146.2 3,973,436
152 Re.28,925
219 3,973,437
339R 3,973,438
3,973,439
421B 3,973,440
432R 3,973,441
515 3,973,442

CLASS 74
3.5 3,973,443
54 3,973,444
89.21 3,973,445
241 3,973,446
242.11B 3,973,447
421A 3,973,449
421R 3,973,448
462 Re.28,926
710.5 3,973,450
750B 3,973,451

CLASS 75
.5AB 3,973,948
112 3,973,949
123D 3,973,950
126Q 3,973,951
171 3,973,952

CLASS 76
101A 3,973,452

CLASS 83
30 3,973,453
55 3,973,454
56 3,973,455
209 3,973,456
411R 3,973,457
414 3,973,458
455 3,973,459

CLASS 84
1.01 3,973,460
1.24 3,973,461
1.25 3,973,462
3,973,463
392 3,973,464

CLASS 86
45 3,973,465

CLASS 89
1A 3,973,466
33C 3,973,467

CLASS 91
25 3,973,468
51 3,973,469
413 3,973,470
472 3,973,471

CLASS 92
13.6 3,973,472
52 3,973,473

CLASS 93
18 3,973,474
36.3 3,973,475
59ES 3,973,476

CLASS 96
1LY 3,973,955
1R 3,973,953
3,973,954
3,973,956
1.1 3,973,957
3,973,958
1.5 3,973,959
3,973,960
3,973,961
1.6 3,973,962
3 3,973,963
36.1 3,973,964
3,973,965
48PD 3,973,967
48R 3,973,966
56.5 3,973,968
100 3,973,979
124 3,973,969

CLASS 98
1 3,973,477
2.14 3,973,478
33A 3,973,479

CLASS 99
359 3,973,480
408 3,973,481
537 3,973,482

CLASS 100
93RP 3,973,483
153 3,973,484

CLASS 101
7 3,973,485
93.19 3,973,486
93.29 3,973,487
110 3,973,488
115 3,973,489
124 3,973,490
3,973,491
126 3,973,492
3,973,493
373 3,973,494
405 3,973,495
415.1 3,973,496

CLASS 102
23 3,973,497
24R 3,973,498
70R 3,973,499
70.2G 3,973,500
81 3,973,501
86.5 3,973,502

CLASS 104
172BT 3,973,503
172S 3,973,504

CLASS 106
15R 3,973,971
35 3,973,970
39.7 3,973,972
40R 3,973,973
50 3,973,974
53 3,973,975
3,973,976
62 3,973,977
95 3,973,978
100 3,973,980
288Q 3,973,981
298 3,973,982
307 3,973,983

CLASS 112
79R 3,973,505
130 3,973,506
136 3,973,507
240 3,973,508

CLASS 114
42 3,973,509
67A 3,973,510
218 3,973,511
235R 3,973,512

CLASS 116
124B 3,973,513
133 3,973,514

CLASS 118
202 3,973,515
262 3,973,516
637 3,973,517
3,973,518

CLASS 119
3 3,973,519
14.08 3,973,520
14.47 3,973,521
103 3,973,522

CLASS 122
510 3,973,523

CLASS 123
3 3,973,524
8.05 3,973,525
8.45 3,973,526
8.47 3,973,527
32EA 3,973,529
32SP 3,973,530
43A 3,973,531
75CC 3,973,532
117A 3,973,533
119A 3,973,535
119D 3,973,534
136 3,973,536
137E 3,973,538
139AQ 3,973,540
139E 3,973,537
3,973,539
140R 3,973,541
3,973,542
141 3,973,543
148CB 3,973,544
3,973,545
179A 3,973,546
193CH 3,973,547
195R 3,973,548
198DB 3,973,550
198R 3,973,549

CLASS 126
21A 3,973,551
271 3,973,552
3,973,553

CLASS 127
19 3,973,984
33 3,973,985
46A 3,973,986

CLASS 128
1.1 3,973,554
2E 3,973,555
2M 3,973,556
2.06E 3,973,557
66 3,973,558
80A 3,973,559
130 3,973,560
132R 3,973,561
142R 3,973,562
156 3,973,563
202 3,973,564
214.4 3,973,565
266 3,973,566
290R 3,973,567
303.15 3,973,568
337 3,973,570
351 3,973,569
408 3,973,571

CLASS 132
7 3,973,574
11R 3,973,528

CLASS 134
12 3,973,987
46 3,973,988
57R 3,973,572
63 3,973,573
141 3,973,989

CLASS 136
6L 3,973,990
26 3,973,991
55 3,973,992
86C 3,973,993
89 3,973,994
107 3,973,995
206 3,973,996
228 3,973,997

CLASS 137
66 3,973,576
82 3,973,577
87 3,973,578
100 3,973,579
101 3,973,580
116 3,973,581
202 3,973,582
312 3,973,583
318 3,973,584
340 3,973,585
460 3,973,586
496 3,973,587
596 3,973,589
601 3,973,590
625.12 3,973,591
625.43 3,973,592
627.5 3,973,593
637 3,973,594
637.1 3,973,595
854 3,973,588

CLASS 138
174 3,973,596

CLASS 139
304 3,973,598
3,973,599
431 3,973,597

CLASS 140
1 3,973,600
92.1 3,973,601

CLASS 141
95 3,973,602
114 3,973,603

CLASS 144
28.8 3,973,604
32R 3,973,605
208B 3,973,606
208E 3,973,607

CLASS 148
6.14R 3,973,998
12R 3,973,999
31.55 3,974,000
32.5 3,974,001
175 3,974,002
187 3,974,003

CLASS 149
7 3,974,004

CLASS 150
1 3,973,609
3 3,973,610

CLASS 151
19A 3,973,611

CLASS 152
361FP 3,973,612
3,973,613
427 3,973,614

CLASS 156
3 3,974,006
64 3,974,007
69 3,974,008
84 3,974,009
93 3,974,010
107 3,974,011
161 3,974,012
165 3,974,013
240 3,974,014
245 3,974,015
272 3,974,016
309 3,974,017
394 3,974,018
429 3,974,019
435 3,974,020

CLASS 157
1.1 3,974,005
1.21 3,973,615

CLASS 159
4A 3,974,021
13B 3,974,022
49 3,974,023

CLASS 160
199 3,973,616

CLASS 162
101 3,974,024
113 3,974,025
358 3,974,026

CLASS 164
113 3,973,617

CLASS 165
27 3,973,618
34 3,973,619
42 3,973,620
83 3,973,621
86 3,973,622
94 3,973,623
114 3,973,624

CLASS 166
.6 3,973,625
250 3,973,626
276 3,973,627
283 3,973,628
295 3,973,629
312 3,973,630

CLASS 169
46 3,973,631

CLASS 172
474 3,973,632

CLASS 173
75 3,973,633
147 3,973,634

CLASS 175
7 3,973,635

CLASS 176
38 3,974,027
50 3,974,028
60 3,974,029

CLASS 177
132 3,973,636
189 3,973,637

CLASS 178
6 3,974,325
3,974,326
6.6R 3,974,327
6.8 3,974,328
3,974,329
3,974,330
7.2 3,974,331
18 3,974,332
69.5R 3,974,333

CLASS 179
1SA 3,974,334
3,974,336
1N 3,974,335
2TV 3,974,337
6C 3,974,338
15AT 3,974,340
15BS 3,974,339
18ES 3,974,343
18FH 3,974,342
18J 3,974,341
81A 3,974,344
170G 3,974,345

CLASS 180
9.46 3,973,638
14R 3,973,639
114 3,973,641
132 3,973,640

CLASS 181
36A 3,973,642

CLASS 182
3 3,973,643
47 3,973,644
48 3,973,645
97 3,973,646

CLASS 184
7A 3,973,647

CLASS 187
29R 3,973,648
3,973,649

CLASS 188
1C 3,973,650
32 3,973,651
73.4 3,973,652
218A 3,973,653
282 3,973,654
328 3,973,655

CLASS 191
12R 3,973,656

CLASS 192
58R 3,973,657
86 3,973,658
89B 3,973,659
93A 3,973,660

CLASS 195
27 3,974,030
29 3,974,031
31R 3,974,032
3,974,033
3,974,034
36C 3,974,035
65 3,974,036
80R 3,973,608
103.5R 3,974,037

CLASS 197
1R 3,973,661
3,973,662
16 3,973,663
187 3,973,664

CLASS 198
19 3,973,665
24 3,973,666
26 3,973,667
106 3,973,668
130 3,973,669
193 3,973,670
248 3,973,671
283 3,973,672
285 3,973,673

CLASS 200
5B 3,974,346
6R 3,974,347
44 3,974,348
61.53 3,974,350
82R 3,974,349
159R 3,974,351
293 3,974,352

CLASS 202
248 3,974,038

CLASS 203
7 3,974,039

CLASS 204
1T 3,974,040
2 3,974,041
25 3,974,042
29 3,974,043
43T 3,974,044
55R 3,974,045
67 3,974,046
90 3,974,047
181 3,974,048
106 3,974,049
129.6 3,974,050
149 3,974,051
159.15 3,974,052
3,974,053
159.24 3,974,129
195S 3,974,054
197 3,974,055
207 3,974,056
213 3,974,057
266 3,974,058
298 3,974,059

CLASS 206
215 3,973,674
418 3,973,675

CLASS 208
59 3,974,060
65 3,974,061
74 3,974,062
120 3,974,063
134 3,974,064
213 3,974,065
289 3,974,066

CLASS 209
3 3,974,067

CLASS 210
23F 3,974,068
45 3,974,069
47 3,974,070
57 3,974,071
65 3,974,072
73R 3,974,073
81 3,974,074
86 3,974,075
136 3,973,407

CLASS 211
87 3,973,676
97 3,973,677
106 3,973,678

CLASS 212
18 3,973,679
76 3,973,680

CLASS 213
8 3,973,681

CLASS 214
1BB 3,973,683
1BT 3,973,682
10.5R 3,973,684
16B 3,973,685
95R 3,973,686

CLASS 215
207 3,973,687
272 3,973,688
317 3,973,689
329 3,973,690

CLASS 219
10.55A 3,974,353
10.55E 3,974,354
10.81 3,974,355
60A 3,974,356
69M 3,974,357
387 3,974,358
522 3,974,359
543 3,974,360

CLASS 220
2.1R 3,973,691
7 3,973,692
66 3,973,693
206 3,973,694

CLASS 221
63 3,973,695

CLASS 222
1 3,973,696
47 3,973,697
91 3,973,698
108 3,973,699
153 3,973,700
190 3,973,701
196.5 3,973,702
199 3,973,703
361 3,973,704

CLASS 223
96 3,973,705

CLASS 224
1B 3,973,776
4D 3,973,706

CLASS 226
118 3,973,707

CLASS 227
10 3,973,708
19 3,973,709
67 3,973,710

CLASS 228
32 3,973,711
57 3,973,712
102 3,973,713
106 3,973,714
112 3,973,715
118 3,973,716
144 3,973,717
183 3,973,718

CLASS 229
5.6 3,973,719
14C 3,973,720
30 3,973,721
31R 3,973,722
33 3,973,723
39R 3,973,724

CLASS 235
61.12R 3,974,361
92PC 3,973,725
92A 3,973,726
92T 3,974,362
151.31 3,974,364
151.32 3,974,365
152 3,974,366
189 3,974,367
925B 3,974,363

CLASS 236
1C 3,974,427
11 3,973,727
13 3,973,728
34.5 3,973,729

CLASS 239
186 3,973,730
265.39 3,973,731
271 3,973,732

CLASS 240
2.25 3,974,368
6.4R 3,974,369
41BM 3,973,370
73BJ 3,974,371
84 3,974,372
128 3,974,373

CLASS 241
1 3,973,733
20 3,973,734
73 3,973,735
76 3,973,736
294 3,973,737

CLASS 242
7.05B 3,973,738
18R 3,973,739
68.5 3,973,740
84.1R 3,973,741
129 3,973,742
186 3,973,743

CLASS 244
137P 3,973,744
173 3,973,745

CLASS 246
187B 3,973,746

CLASS 248
16 3,973,747
280 3,973,748

CLASS 249
65 3,973,749
114 3,973,750

CLASS 250
201 3,974,374
206 3,974,375
213VT 3,974,376
222R 3,974,377
223B 3,974,378
233 3,974,379
288 3,974,380
310 3,974,381
327 3,974,382
342 3,974,383
401 3,974,384
402 3,974,385
3,974,386
409 3,974,387
445T 3,974,388
483 3,974,389
492B 3,974,391
492R 3,974,390
499 3,974,392

CLASS 251
61.1 3,973,751
149.6 3,973,752
204 3,973,753

CLASS 252
8.55R 3,974,077
8.8 3,974,076
62.1P 3,974,078
62.56 3,974,079
78.3 3,974,080
79 3,974,081
95 3,974,082
180 3,974,083
182 3,974,084
186 3,974,085
188.3CL 3,974,086
299 3,974,087
301.1R 3,974,088
384 3,974,089
389A 3,974,090
417 3,974,091
429B 3,974,092
3,974,094
429R 3,974,093
3,974,095
439 3,974,096
440 3,974,097
443 3,974,098
453 3,974,099
455R 3,974,100
458 3,974,101
466J 3,974,102
3,974,103
478 3,974,104
512 3,974,105
516 3,974,106
520 3,974,107
521 3,974,108

CLASS 254
139.1 3,973,754
150R 3,973,755

CLASS 256
21 3,973,756

CLASS 259
4R 3,973,757
6 3,973,758
8 3,973,759
72 3,973,760

CLASS 260
2.5AV 3,974,109
2.5HB 3,974,110
2.5R 3,974,111
4R 3,974,112
18EP 3,974,113
23H 3,974,114
29.2UA 3,974,116
29.2N 3,974,115
29.6RB 3,974,119
29.6TA 3,974,117
29.6WQ 3,974,118
30.4SB 3,974,120
37SB 3,974,122
37R 3,974,121
40P 3,974,123
40R 3,974,124
3,974,125
47XA 3,974,126
75N 3,974,127
79.3MU 3,974,130
112R 3,974,134
112.5LH 3,974,135
176 3,974,136
239.1A 3,974,141
239.1 3,974,140
239.55D 3,974,143
240CA 3,974,144
240D 3,974,147
240K 3,974,145
240R 3,974,146
242 3,974,148
3,974,149
243C 3,974,150
3,974,151
3,974,152
3,974,153
3,974,154
247.1R 3,974,155
3,974,156
247.2B 3,974,157
247.5R 3,974,158
3,974,159
249 3,974,160
256.4F 3,974,161
256.5R 3,974,162
269.1 3,974,142
281GP 3,974,163
287CF 3,974,165
287A 3,974,164
290HL 3,974,166
294.9 3,974,167
295R 3,974,169
295T 3,974,168
306 3,974,170
306.7E 3,974,171
307FA 3,974,173
307D 3,974,172
308R 3,974,174
310R 3,974,175
3,974,176
314.5 3,974,177
326.28 3,974,179
326.5B 3,974,178
335 3,974,180
340.9 3,974,181
3,974,182
343.3R 3,974,183
345.2 3,974,184
346.2R 3,974,185
380 3,974,186
396R 3,974,187
397.2 3,974,188
408 3,974,189
3,974,190
3,974,191
3,974,192
3,974,193
410.6 3,974,194
410.9R 3,974,195
3,974,196
439R 3,974,197
448.2E 3,974,198
464 3,974,199
468D 3,974,200
471R 3,974,201
476R 3,974,202
3,974,203
479C 3,974,204
485H 3,974,205
486D 3,974,207
486R 3,974,206
501.11 3,974,208
502.5 3,974,209
512R 3,974,210
513T 3,974,211
519 3,974,212
520B 3,974,213
524R 3,974,214
534R 3,974,215
541 3,974,216
543P 3,974,217
558P 3,974,218
562R 3,974,219
569.6P 3,974,220
586P 3,974,221
586R 3,974,222
600R 3,974,223
601R 3,974,224
3,974,225
3,974,226
604HF 3,974,227
610B 3,974,228
621R 3,974,229
652.5R 3,974,230
666A 3,974,231
3,974,232
683D 3,974,233
857G 3,974,234
876R 3,974,235
878B 3,974,236
3,974,237
879 3,974,238
3,974,239
897B 3,974,240
3,974,241
927N 3,974,242
941 3,974,243

CLASS 261
92 3,974,244

CLASS 264
10 3,974,245
24 3,974,246
28 3,974,247
40.2 3,974,248
65 3,974,249
68 3,974,250
194 3,974,251
299 3,974,252

CLASS 266
135 3,973,762
233 3,973,763
272 3,973,761

CLASS 269
26 3,973,764
37 3,973,765
43 3,973,766

CLASS 271
12 3,973,767
99 3,973,768
173 3,973,769
272 3,973,770

CLASS 272
8R 3,973,771
76 3,973,772

CLASS 273
94R 3,973,773
95R 3,973,774
134AA 3,973,775

CLASS 274
23R 3,973,777
39R 3,973,778

CLASS 277
25 3,973,779
81R 3,973,780
134 3,973,781
142 3,973,782
190 3,973,783

CLASS 279
1A 3,973,784

CLASS 280
11 3,973,785
747 3,973,786

CLASS 281
21R 3,973,787

CLASS 282
19R 3,973,788

CLASS 285
39 3,973,789
61 3,973,790
305 3,973,791
341 3,973,792

CLASS 290
40R 3,974,393
44 3,974,394
3,974,395
54 3,974,396

CLASS 292
144 3,973,793
254 3,973,794

CLASS 294
65 3,973,795

CLASS 296
28C 3,973,796

CLASS 297

284 3,973,797
296 3,973,798
341 3,973,799
440 3,973,800

CLASS 301

37C 3,973,801

CLASS 302

24 3,973,802

CLASS 303

2 3,973,804
9 3,973,805
21AF 3,973,806
89 3,973,803

CLASS 305

40 3,973,807
54 3,973,808

CLASS 307

82 3,974,397
147 3,974,398
233R 3,974,399
237 3,974,400
241 3,974,401
264 3,974,402
270 3,974,403
303 3,974,404
304 Re.28,928

CLASS 308

6C 3,973,809
9 3,973,810
189R 3,973,811

CLASS 310

9.8 3,974,405
67R 3,974,406
71 3,974,407
103 3,974,408
260 3,974,409

CLASS 312

100 3,973,812
186 Re.28,927
204 3,973,813
333 3,973,814

CLASS 313

42 3,974,410
105CM 3,974,411
131R 3,974,412
222 3,974,413
331 3,974,414
371 3,974,415
417 3,974,416

CLASS 315

5.43 3,974,417
59 3,974,418
241P 3,974,419
379 3,974,420
399 3,974,421

CLASS 316

20 3,973,815
25 3,973,816

CLASS 317

13A 3,974,422
26 3,974,423
80 3,974,424
123 3,974,425
132 3,974,426

CLASS 318

314 3,974,428
350 3,974,429
473 3,974,430
561 3,974,431
562 3,974,432
635 3,974,433
696 3,974,434

CLASS 321

9A 3,974,435
13 3,974,436
27R 3,974,437

CLASS 323

9 3,974,438
17 3,974,439
44R 3,974,440

CLASS 324

29.5 3,974,441
37 3,974,442
64 3,974,443
115 3,974,444
123R 3,974,445
133 3,974,446

CLASS 325

1 3,974,447
3,974,448
321 3,974,449
344 3,974,450
392 3,974,451
470 3,974,452

CLASS 329

50 3,974,453

CLASS 330

4.3 3,974,454
22 3,974,455
35 3,974,456

CLASS 331

1A 3,974,457
94.5PE 3,974,458
96 3,974,459

CLASS 332

17 3,974,461
31T 3,974,460

CLASS 333

22R 3,974,462
30R 3,974,463
3,974,464
31R 3,974,465
72 3,974,466
95A 3,974,467

CLASS 335

151 3,974,468
153 3,974,469

CLASS 338

114 3,974,470
202 3,974,471

CLASS 339

14R 3,973,817
22B 3,973,818
209 3,973,819
230R 3,973,820
266R 3,973,821
274 3,973,822
276R 3,973,824
276T 3,973,823

CLASS 340

3D 3,974,473
10 3,974,474
15 3,974,475
18R 3,974,476
58 3,974,477
166R 3,974,478
172.5 3,974,479
3,974,480
3,974,481
3,974,482
3,974,483
3,974,484
173DR 3,974,485
173R 3,974,486
174TF 3,974,487
214 3,974,488
261 3,974,489
268 3,974,490
272 3,974,491
280 3,974,492
309.1 3,974,495
324AD 3,974,493
3,974,494
337 3,974,472
3,974,496
3,974,497
347DA 3,974,498
392 3,974,499

CLASS 343

8 3,974,500
14 3,974,501
105R 3,974,502
3,974,503

CLASS 346

7 3,974,504
44 3,974,505
45 3,974,506
76L 3,974,507
140R 3,974,508

CLASS 350

6 3,973,825
7 3,973,826
91 3,973,827
96WG 3,973,828
160LC 3,973,830
160R 3,973,829
184 3,973,831
214 3,973,832
232 3,973,833
310 3,973,834
319 3,973,835

CLASS 351

7 3,973,836
160 3,973,837
3,973,838

CLASS 352

5 3,973,839
86 3,973,840
91C 3,973,841

CLASS 353

19 3,973,842

CLASS 354

51 3,974,509
86 3,974,510
147 3,974,511
226 3,974,512
295 3,974,513

CLASS 355

3R 3,973,843
3,973,844
15 3,973,845
16 3,973,846
85 3,973,847

CLASS 356

51 3,973,848
97 3,973,849
100 3,973,850
106LR 3,973,851
207 3,973,852

CLASS 357

17 3,974,514
23 3,974,515
42 3,974,516
48 3,974,517
81 3,974,518

CLASS 358

8 3,974,519
17 3,974,520
32 3,974,521

CLASS 360

14 3,974,522
40 3,974,523
75 3,974,524

CLASS 401

190 3,973,853

CLASS 403

170 3,973,854
171 3,973,855

CLASS 404

25 3,973,856
112 3,973,857

CLASS 408

11 3,973,858
12 3,973,859
108 3,973,860
154 3,973,861
204 3,973,862
241R 3,973,863

CLASS 415

8 3,973,864
53T 3,973,865
121B 3,973,866
143 3,973,867
157 3,973,868
160 3,973,869
168 3,973,870
198R 3,973,871
211 3,973,872

CLASS 416

43 3,973,873
97A 3,973,874
241B 3,973,875
244A 3,973,876

CLASS 417

38 3,973,877
50 3,973,878
69 3,973,879

CLASS 418

61B 3,973,880
81 3,973,881
121 3,973,882
178 3,973,883

CLASS 423

27 3,974,253
210 3,974,254
212 3,974,255
230 3,974,256
242 3,974,257
3,974,258
249 3,974,259
265 3,974,260
300 3,974,261
313 3,974,262
3,974,263
447.4 3,974,264
466 3,974,265
478 3,974,266
633 3,974,267

CLASS 424

1 3,974,268
1.5 3,974,269
47 3,974,270
64 3,974,271
78 3,974,272
122 3,974,273
180 3,974,274
248 3,974,275
250 3,974,276
251 3,974,277
3,974,278
258 3,974,279
263 3,974,280
3,974,281
3,974,282
3,974,283
267 3,974,284
3,974,285
270 3,974,286
3,974,287
271 3,974,288
281 3,974,289
283 3,974,290
3,974,291
303 3,974,292

CLASS 425

4R 3,973,884
65 3,973,885
78 3,973,886
101 3,973,887
125 3,973,888
130 3,973,889
144 3,973,890
246 3,973,891
250 3,973,892
324R 3,973,893
370 3,973,894
372 3,973,895
387B 3,973,896
3,973,897

CLASS 426

4 3,974,293
32 3,974,294
72 3,974,295
104 3,974,296
106 3,974,297
548 3,974,299
553 3,974,298
565 3,974,300
640 3,974,301

CLASS 427

21 3,974,302
27 3,974,303
58 3,974,304
67 3,974,305
183 3,974,306
212 3,974,307
244 3,974,308
250 3,974,309
390 3,974,310

CLASS 428

43 3,974,311
91 3,974,312
176 3,974,313
212 3,974,314
3,974,315
215 3,974,316
3,974,317
260 3,974,318
283 3,974,319
3,974,320
395 3,974,321
433 3,974,322
457 3,974,323
458 3,974,324

CLASS 431

76 3,973,898
202 3,973,899

CLASS 526

14 3,974,128
20 3,974,132
263 3,974,131
344 3,974,133

CLASS 536

4 3,974,138
10 3,974,137
84 3,974,139

CLASSIFICATION OF DESIGNS

D6— 24 240,870
32 240,871
74 240,872
76 240,873
78 240,874
90 240,875
114 240,876
117 240,877
118 240,878
192 240,879
194 240,880
255 240,881
269 240,882
D7— 17 240,883
20 240,884
28 240,885
49 240,886
59 240,887
77 240,888
137 240,889
D8— 29 240,890
98 240,891
183 240,892
240,893
240,894
216 240,895
235 240,896
D9— 87 240,897
119 240,898
125 240,899
147 240,900
191 240,901
224 240,902
D10— 72 240,903
114 240,904
240,905
125 240,906
240,907
126 240,908
D12— 76 240,909
111 240,910
114 240,911
147 240,912
156 240,913
184 240,914
D13— 6 240,915
D19— 20 240,918
38 240,919
64 240,916
240,917
D22— 27 240,920
240,921
29 240,922
D23— 4 240,923
240,924
240,925
240,926
240,927
32 240,928
46 240,929
67 240,930
105 240,931
D24— 1D 240,932
D26— A 240,933
240,934
5C 240,935
14A 240,936
L 240,937
D27— 3 240,938
D34— 2R 240,939
240,940
240,941
3 240,942
240,943
4R 240,944
5BB 240,946
GC 240,947
GH 240,948
240,949
SS 240,950
240,951
240,945
14C 240,952
15AJ 240,953
LL 240,954
R 240,955
D35— 3A 240,956
240,957
D40— 1R 240,958
D56— 4B 240,959
D59— 2A 240,960
240,961
B 240,962
240,963
D61— 1F 240,964
Q 240,965
D64— 10 240,966
11B 240,967
D83— 8A 240,968
D86— 10F 240,969

CLASSIFICATION OF PLANTS

P. — 88 3,939
P. — 3,939

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama 1
Alaska 2
American Samoa 3
Arizona 4
Arkansas 5
California 6
Canal Zone 7
Colorado 8
Connecticut 9
Delaware 10
District of Columbia 11
Florida 12
Georgia 13
Guam 14
Hawaii 15
Idaho 16
Illinois 17
Indiana 18
Iowa 19
Kansas 20
Kentucky 21
Louisiana 22
Maine 23
Maryland 24
Massachusetts 25
Michigan 26
Minnesota 27
Mississippi 28
Missouri 29
Montana 30
Nebraska 31
Nevada 32
New Hampshire 33
New Jersey 34
New Mexico 35
New York 36
North Carolina 37
North Dakota 38
Ohio 39
Oklahoma 40
Oregon 41
Pennsylvania 42
Puerto Rico 43
Rhode Island 44
South Carolina 45
South Dakota 46
Tennessee 47
Texas 48
Utah 49
Vermont 50
Virginia 51
Virgin Islands 52
Washington 53
West Virginia 54
Wisconsin 55
Wyoming 56
U.S. Air Force 57
U.S. Army 58
U.S. Navy 59

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

3,973,470
3,973,680
1 : 3,973,286
3,973,442
3,973,695
3,974,004
3,974,330
3,974,359
4 : 3,973,639
3,973,873
3,974,106
3,974,335
3,974,402
3,974,404
3,974,451
5 : 3,974,225
3,974,428
6 : 3,973,279
3,973,282
3,973,313
3,973,317
3,973,321
3,973,338
3,973,354
3,973,371
3,973,385
3,973,406
3,973,413
3,973,418
3,973,435
3,973,444
3,973,461
3,973,466
3,973,468
3,973,469
3,973,472
3,973,486
3,973,499
3,973,511
3,973,519
3,973,520
3,973,534
3,973,549
3,973,552
3,973,566
3,973,576
3,973,579
3,973,584
3,973,596
3,973,615
3,973,616

3,973,630
3,973,741
3,973,744
3,973,745
3,973,746
3,973,753
3,973,763
3,973,788
3,973,789
3,973,794
3,973,805
3,973,812
3,973,825
3,973,839
3,973,857
3,973,863
3,973,864
3,973,868
3,973,913
3,973,973
3,973,997
3,974,008
3,974,012
3,974,065
3,974,210
3,974,299
3,974,325
3,974,329
3,974,383
3,974,430
3,974,434
3,974,456
3,974,459
3,974,478
3,974,504
3,974,506
8 : 3,973,334
3,973,335
3,973,346
3,973,411
3,973,464
3,973,628
3,973,629
3,973,678
3,973,734
3,973,948
3,973,949
3,973,988
3,974,249
3,974,419
3,974,523

3,974,524
9 : 3,973,373
3,973,390
3,973,395
3,973,528
3,973,663
3,973,705
3,973,834
3,973,848
3,973,851
3,973,897
3,973,941
3,973,993
3,974,083
3,974,161
3,974,213
3,974,274
3,974,287
3,974,426
10 : 3,973,386
3,973,946
3,973,947
3,974,037
3,974,127
3,974,138
11 : 3,973,771
12 : Re.28,927
3,973,364
3,973,383
3,973,384
3,973,387
3,973,440
3,973,510
3,973,586
3,973,643
3,973,731
3,973,853
3,974,102
3,974,103
3,974,318
3,974,328
3,974,477
3,974,517
13 : 3,973,281
3,973,701
3,973,754
3,974,067
3,974,338
15 : 3,973,283
3,974,395
16 : 3,973,377

3,973,723
3,973,803
3,974,054
17 : Re.28,924
3,973,302
3,973,314
3,973,318
3,973,330
3,973,333
3,973,353
3,973,380
3,973,423
3,973,429
3,973,463
3,973,494
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DESIGN PATENTS

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PLANT PATENTS

6 : 3,939

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U. S. GOVERNMENT PRINTING OFFICE : O - 1976

U.S. DEPARTMENT OF COMMERCE

Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE

C. Marshall Dann, *Commissioner*